# Base Load Power Hub (BLPH)

EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX - TRANSITION PIECE FLANGE

Document Number: 1724000344-QC-LIS-00013

Document Class: 2

| Rev. | Date | Description | Prepared | Reviewed | Approved |
|---|---|---|---|---|---|
| 1 | 30/04/2025 | Issue for Review (IFR) | Ainhoa Lasa | Ainhoa Lasa | Urtzi Landa |
| 0 | 09/05/2024 | Issue for Review (IFR) | Ainhoa Lasa | Ainhoa Lasa | Urtzi Landa |

GRI Flanges Iraeta

FIHI Forging Industry S.L.




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## Revision / Change Log

| Rev. | Description |
|---|---|
| 0 | Issue for Review (IFR) |
| 1 | Issue for Review (IFR) |
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FIHI FORGING INDUSTRY, S.L.

# QUALITY CERTIFICATE / CERTIFICADO CALIDAD

## EN10204 3.2

| | | | | | |
|---|---|---|---|---|---|
| **Nº Certificado:** Certificate Nº: | 040000373956_06 | **Fecha:** Date: | 10.05.2024 | **Nº Cert. Ensayo:** Test Cert. Nº: | FIHI024415 |
| **Cliente:** Customer: | ROSETTI MARINO S.P.A. | **Nº Pedido:** Order Nº: | 1724000344 123A90A | **Nº Albarán:** Delivery Note Nº: | 200147404/10 |
| **Nº Plano Cliente:** Customer Drawing Nº: | 123A90-DDL-ST-DD-90083 | | | **Cod. Artículo:** Article Code: | 2022215 |
| **Material:** Material: | EN10025-3-S420NL | **Trat. Térmico:** Heat Treatment: | H5-0379 NORMALIZADO (+N) NORMALIZED (+N) | **Estado Suministro:** Delivery Condition: | MECANIZADO MACHINED |

| Cantidad Quantity | Descripción Artículos Articles description | Nº Colada Heat Nº | (1)Ref. Probeta(2) (1)Testing Piece Ref.(2) | Observaciones Observations |
|---|---|---|---|---|
| 1 | 5888 - LAM-7000x6350X280-ST-DD-90083-R2<br>Ref. Brida (Flange) M-2022215 L/SN-1399936<br>Ref. Aro (Ring) M-5018780 L/SN-1397272 | 466767 | (EP)374560-L (M) | |

(1) TIPO PROBETA/*Type:* -EP: TOCHO/*End Piece* -R: ARANDELA/*Ring* -C: CUPÓN/*Coupon*

(2) SITUACIÓN/*Location:* -M: MATERIAL BASE/*Base Material* -W: SOLDADURA/*Welding* -H: ZAT/*HAZ*

## COMPOSICIÓN QUÍMICA (%) / CHEMICAL COMPOSITION (%)

| Ref. Probeta *Testing Piece Ref.* | (3) | C | Si | Mn | P | S | Nb | V | Al (4) | Ti | Cr | Ni | Mo | Cu | N | B | O | CEV (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 466767 | L | 0,1470 | 0,3200 | 1,3300 | 0,0130 | 0,0090 | 0,0030 | 0,0720 | 0,0290 | 0,0048 | 0,1100 | 0,0700 | 0,0200 | 0,1200 | 0,0098 | - | - | 0,4220 |
| (EP)374560-L (M) | P | 0,1590 | 0,3200 | 1,2700 | 0,0120 | 0,0090 | 0,0020 | 0,0670 | 0,0210 | 0,0040 | 0,1100 | 0,0600 | 0,0160 | 0,1100 | 0,0081 | - | - | 0,4220 |

(3) L = ANÁLISIS DE COLADA/ *Laddle Analysis*
P = ANÁLISIS DE PRODUCTO/ *Product Analysis*

(4)Si la cantidad de elementos fijadores del N es suficiente (Nb:0.015-0.06% o V: 0.02-0.12%), la cantidad mínima de Al no aplica (material acorde a EN10025/EN10028/EN10273) /The minimum value for aluminium does not apply if other N binding elements are present in sufficient quantity (Nb: 0.015-0.06% or V: 0.02-0.12%). (Materials according to EN10025/EN10028/EN10273)

(5) CEV% (EN-10025-1) = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15

## CARACTERÍSTICAS MECÁNICAS / TAMAÑO GRANO - MECHANICAL PROPERTIES / GRAIN SIZE

| Ref. Probeta *Testing Piece Ref.* | Ensayo de Tracción *Tensile Test* (ISO 6892-1) | | | | Estricción (%) *Reduction of Area (%)* (EN 10164) | | | Resistencia al Impacto KV2 *Impact Strength KV2* (ISO 148-1) | | | | Dureza *Hardness* | Tamaño de Grano *Grain Size* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (6) | Resist. Tracción *Tensile Strength* Rm MPa | Límite Elástico *Yield Strength* ReH MPa | Alargamiento *Elongation* Lo=5d A % | (6) | Valores Unitarios *Unitary values* % | Media *Average* % | (6) | Valores Unitarios *Unitary Values* J | Media *Average* J | Temp./ *Temp.* °C | HBW (ISO 6506-1) | (ASTM E-112) |
| (EP)374560-L (M) | L | 505 | 366 | 35,6 | Z | 66-67-67 | 67 | L | 143-131-135 | 136 | -40 | - | - |
| | | | | | | | | T | 63-64-33 | 53,33 | -40 | | |

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 13/05/2024

(6) ORIENTACIÓN / *Orientation:* -T: TRANSVERSAL/*Transversal* -L: LONGITUDINAL/*Longitudinal* -Z: SENTIDO DEL ESPESOR/*Through thickness.*

**DECLARACIÓN DE CONFORMIDAD** *DECLARATION OF CONFORMITY:*

LOS PRODUCTOS INCLUIDOS EN EL PRESENTE DOCUMENTO SON CONFORMES CON LOS REQUISITOS DEL PEDIDO DE CLIENTE Y CON LOS DE LA(S) NORMA(S) DEL MATERIAL ARRIBA REFERIDO(S)

*The product herein in this document has been made and tested in accordance with the requirements of the above mentioned order and standard.*

**VALIDADO POR**
*VALIDATED BY:*

**Departamento de Calidad:**
*Quality department:*

Nora Lasa

D.Herrera
13/May/2024

BUREAU VERITAS 2400 2400-CPR-20220126

UKCA

CE 2451 2451-CPR-EN10025-2014.0001

FIHI Forging Industry S.L.

*Environmental recommendations related to the product: At GRI Renewables we understand caring for the environment as a responsible management model in collaboration with our stakeholders, therefore, and with the aim of reducing the environmental impact of our activity and, therefore,of our production chain, we recommend to our clients and to all the parties involved in our life cycle, carry out a correct segregation and treatment of the waste generated, prioritizing its minimization, reuseand recycling, in accordance with the applicable legislation.*

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

# Declaration of performance

The manufacturer

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa) SPAIN**

declares herewith, that the construction product

**Flanges produced by hot rolled products of structural steel according to EN 10025-1**

with serial number

M-2022215 L-1399936

produced in factory

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa) SPAIN**

fulfills the requirements of the following EU-directive/s and harmonized specifications:

- **EN 10025-1**
- **EU 305**
- **EN 1090-1**
- **EN 1090-2 EXC 4**

The notified body/ies:

- **UKAS CPR: certified by TWI Certification Ltd /Notified body No. 2400 / Certificate No. 2400-CPR-20220126**
- **CE CPR: certified by DVS ZERT / Notified body No.2451 / Certificate No. 2451-CPR-EN10025-2014.0001.006**

And with customers specifications and drawings according to Purhase Order 1724000344

| DRAWING | SPECIFICATION |
|---|---|
| 123A90-DDL-ST-DD-90083-R2 | 123A90-DDL-ST-SP-90118 Document Class: 2 Rev.1, SPC-PRO-01Rev.2024-00, 123A90-DDL-ST-SP-90118_IFA REV.02 (05032024) |

The performance of the products above is in conformity with the set of declared performance/s. This declaration of performance is issued in accordance with Regulation (EU) No 305/2011/EU and Construction products (amendment etc.) (EU exit) Regulations 2020, UK statutory instrument 2020, under the sole responsibility of the manufacturer identified above.

Zestoa, 10.05.2024

FIHI FORGING INDUSTRY S.L

FIHI Forging Industry S.L.

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

*FIHI FORGING INDUSTRY S.L*
*Meagako errepidea, 10*
*20740 Zestoa (Gipuzkoa) SPAIN*

*Business ID /C.I.F.*
*B75225946*

*www.grupoiraeta.com*
*Tel. +34 943 147 645*
*Fax. +34 943 897 029*

Information is marked as Restricted and belongs to GRI.

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

CE UKCA

2451 2400

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa)**
**SPAIN**
**08 - 22**
2451-CPR-EN10025-2014.0001.006
2400-CPR-20220126

**EN 10025-1**
Hot rolled products of structural steels

| | |
|---|---|
| Intended uses: | Building constructions or civil engineering |
| Tolerances on dimensions and shape: | Welded parts EN 10029 Class A |
| Elongation: | Normalized Steel EN 10025-3 S420NL |
| Tensile strength | |
| Yield strength | |
| Impact strength | |
| Weldability | |
| Durability: | NPD. |
| Regulated substance: | NPD. |



FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 10 / 2024

Information is marked as Restricted and belongs to GRI.

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

**CE & UKCA Marking used for Inspection Certificates according to EN 10204**

CE

2451

2451-CPR-EN10025-2014.0001.006

UK CA

2400

2400-CPR-20220126

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13/05/2024

*FIHI FORGING INDUSTRY S.L*
*Meagako errepidea, 10*
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Information is marked as Restricted and belongs to GRI.

ACCIAIERIE BERTOLI SAFAU
ABSOLUTE STEEL QUALITY
ACCIAIERIE BERTOLI SAFAU SpA
Via Buttrio n.28 - Frazione Cargnacco - 33050 Pozzuolo del Friuli (UD)
Tel. +39 0432 613211 - Fax +39 0432 613209 - www.absacciai.it

# CERTIFICATO DI COLLAUDO

Inspection Certificate 3.1/Certificat de reception 3.1/
Abnahmeprufzeugnis 3.1

| | |
|---|---|
| N. | 291974 / 1 |
| Data | 08.06.2021 |
| COLATA N. Heat-Couée-Schmelze | 466767 |
| Pag. | 1 / 1 |

| | | | |
|---|---|---|---|
| CLIENTE Customer-Client-Besteller | FIHI FORGING INDUSTRY S.L. | ORDINE Order-Commande-Bestellung | 4500252451 |
| PROFILO Shape-Section-Profili | CONTINUOUS CAST ROUND BARS , 600 MM - | STATO DI FORNITURA SupplyCondition-Etat de livraison | UNTREATED |
| ACCIAIO Steel-Acier-Stahl | S420 | COMESSA/POS Sales Order/Pos: | 1075944/10 |

CAPITOLATO ABS: Technical Specification: ABS

CAPITOLATO DI ANALISI: Material Specification: FORJAS IRAETA SP_FIR_DP_01_03_R0 03/09/2020

CAPITOLATO DI FORNITURA: Technical Delivery Requirements:

**COMPOSIZIONE CHIMICA DI COLATA %**

CAST ANALYSIS % - COMPOSITION CHIMIQUE DE COULEE % - SCHMELZE CHEMISCHE ANALYSE %

| | C | Mn | Si | P | S | Cr | Ni | Mo | Al (T) | Cu | Sn | Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min | | 1,00 | | | | | | | 0,015 | | | |
| Max | 0,200 | 1,70 | 0,60 | 0,025 | 0,010 | 0,30 | 0,80 | 0,10 | 0,300 | 0,55 | 0,100 | 0,0500 |
| Colata/Heat | 0,147 | 1,33 | 0,32 | 0,013 | 0,009 | 0,11 | 0,07 | 0,02 | 0,029 | 0,12 | 0,006 | 0,0048 |
| | B (T) | V | Nb | As | Ca | Sb | Co | O/ppm | H/ppm | N/ppm | C EQ. LONG FORMULA | H1 TUNDISH |
| Min | | | | | | | | | | | | |
| Max | 0,0008 | 0,200 | 0,050 | 0,100 | 0,1000 | 0,100 | 0,300 | 20,00 | 2,00 | 250 | 0,460 | 2,0 |
| Colata/Heat | 0,0001 | 0,072 | 0,003 | 0,004 | 0,0014 | 0,001 | 0,009 | 8,00 | 0,70 | 98 | 0,422 | 1,7 |

**COMPOSIZIONE CHIMICA SOLIDO%**

CHEMICAL ANALYSIS II % - COMPOSITION CHIMIQUE II % - CHEMISCHE ZUSAMMENSETZUNG II %

| | C | Mn | Si | P | S | Cr | Ni | Mo | Al (T) | Cu | Sn | Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min | | | | | | | | | | | | |
| Max | | | | | | | | | | | | |
| Colata/Heat | 0,145 | 1,34 | 0,32 | 0,013 | 0,009 | 0,11 | 0,07 | 0,02 | 0,029 | 0,12 | 0,006 | 0,0046 |
| | B (T) | V | Nb | As | Ca | Sb | Co | C Eq. Formula | | | | |
| Min | | | | | | | | | | | | |
| Max | | | | | | | | | | | | |
| Colata/Heat | 0,0001 | 0,069 | 0,003 | 0,004 | 0,0014 | 0,001 | 0,009 | 0,421 | | | | |

**CARATT. MECCANICHE**

MECHANICAL PROPERTIES - CARACTERISTIQUES MECANIQUE - MECHANISCHE EIGSNSCHAFTER

TRATTAMENTO TERMICO HEAT TREATMENT

**NOTE**

ANTIMIX 100 %

TEST CERTIFICATE ISSUED ACCORDING TO: EN 10204/3.1

"NO WELDING REPAIRS"

COUNTRY OF ORIGIN : ITALY

VACUUM DEGASSED STEEL .

ELECTRIC ARC FURNACE STEEL .

FINE GRAIN STEEL .

FULLY KILLED .

- Material free from lead, mercury, cadmium and hexavalent chromium (dir. 2000/53/CE - dir. 2011/65/UE as amended)
- Material with radioactivity not exceeding 0,1Bq/g (d.lgs. 230/1995 as amended)

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2021

**CONTROLLO QUALITA'**

QUALITY CONTROL - CONTROLE DE QUALITE - QUALITATSSTEILE

Company with a management system certified by IGQ to
ISO 9001 and IATF 16949

Verif.:Omar Tonetti

FIHI
Forging Industry S.L.

# Certificado de Inspección 3.1

LINCOLN ELECTRIC
THE WELDING EXPERTS

Línea productos **FCAW**
Producto **OUTERSHIELD MC420NP-H**
Tamaño (mm) **1,6**
Item No. **943317**
Lote **P1FC226195**

Clasificación **AWS A5.28 E70C-G-H4**
**ISO 17632-A T 38 Z Z M M21 2 H5**

Pedido Cliente **4500326667**
Nuestra Orden **818890832**
Cantidad **1800.0 KG**
Cliente **FIHI FORGING INDUSTRY S.L.**

**BARRIO CHIRIBOGA S/N**
**CESTONA 20740**
**España**

**Análisis Químico(%)** According to EN10204 3.1

| C | Si | Mn | P | S | Cr | Ni | Mo | Nb | Cu | V | Ti | Al |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.045 | 0.53 | 0.86 | 0.010 | 0.013 | 0.04 | 2.75 | 0.01 | 0.11 | 0.03 | <0.01 | 0.010 | <0.001 |

| Sn | Pb | Zr | N |
|---|---|---|---|
| 0.010 | <0.001 | <0.001 | 0.010 |

**Propiedades mecánicas, Metal Depositado** According to EN10204 3.1

**Tensile testing**

| Cond. | Temp. °C | ReL MPa | Rm MPa | A5 % |
|---|---|---|---|---|
| PWHT 4.0h@900°C | 21 | 381 | 543 | 30 |

**Impact testing**

| Cond. | Temp °C | Impac J |
|---|---|---|
| PWHT 4.0h@900°C | -50 | 150 |

**Diffusible hydrogen** According to EN10204 3.1

HDM as Manufactured
2.7 ml/100g

**Observaciones**

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13./05./2024

14/06/2023

El producto arriba mencionado ha sido fabricado, controlado y suministrado en cumplimiento con el Sistema de aseguramiento de Calidad certificado según ISO 9001.

Compañia
**Lincoln Electric Iberia S.L.**
**CTRA. LAUREA MIRO 396-398**
**08980 SAINT FELIU DE LLOBREGAT**
**Spain**

Impreso por
**R.Polaczek**
POSITION:
Quality & R&D Manager

Impreso por
Por **David Jodra**
Cargo **Operation Manager**
**Consultant**
Fecha **13/JUN/2023**

Cert.número
**02077715**
ZEU_LOWALLOY, 1

METRODE
SPECIAL ALLO

GRI Flonges Iraeta

FIHI FORGING INDUSTRY, S.L.

# Certificado de tratamiento térmico
# Heat treatment certificate

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

| HORNO / FURNACE: | HO-05 | Nº HORNADA / TREATMENT Nº: | H5-0379 | MATERIAL / MATERIAL: | Aro |
|---|---|---|---|---|---|
| FECHA INICIO / STARTING DATE: | 01/05/2024 23:13:00 | FECHA FINAL / FINISHING DATE: | 02/05/2024 17:53:09 | PESO / WEIGHT [Kg]: | 79175 |
| PERMANENCIA REAL / REAL HOLDING TIME [min]: | 429 | PERMANENCIA PREVISTA / SCHEDULED HOLDING TIME [min]: | 420 | MAYOR ESPESOR / MAX. THICKNESS [mm]: | 305 |

| DESCRIPCIÓN MATERIAL<br>MATERIAL DESCRIPTION | BATCH | ESPESOR (mm) /<br>THICKNESS (mm) |
|---|---|---|
| M5018400 C/482504 (UND 2) | B-373312 | 240 |
| M5018400 C/482505 (UND 3) | B-373311 | 240 |
| M5018780 C/466767 (UND 1)(PROB 1) | B-374560 | 305 |
| 320x105x1400 C/466767(UND 2) (PROB 1) | L-1392810 | 105 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |

FIHI FORGING INDUSTRY, S.L. certifica que el material detallado en el presente documento, ha sido sometido al tratamiento térmico según la especificación que se detalla en este documento

FIHI FORGING INDUSTRY, S.L. certifies that the detailed material of this document has been treated according the especification below referenced.

| ESPECIFICACIÓN DE TRATAMIENTO TÉRMICO / SPECIFICATION FOR HEAT TREATMENT | Normalizado según / Normalized according IN_FIR_PT_04/10/24 |
|---|---|

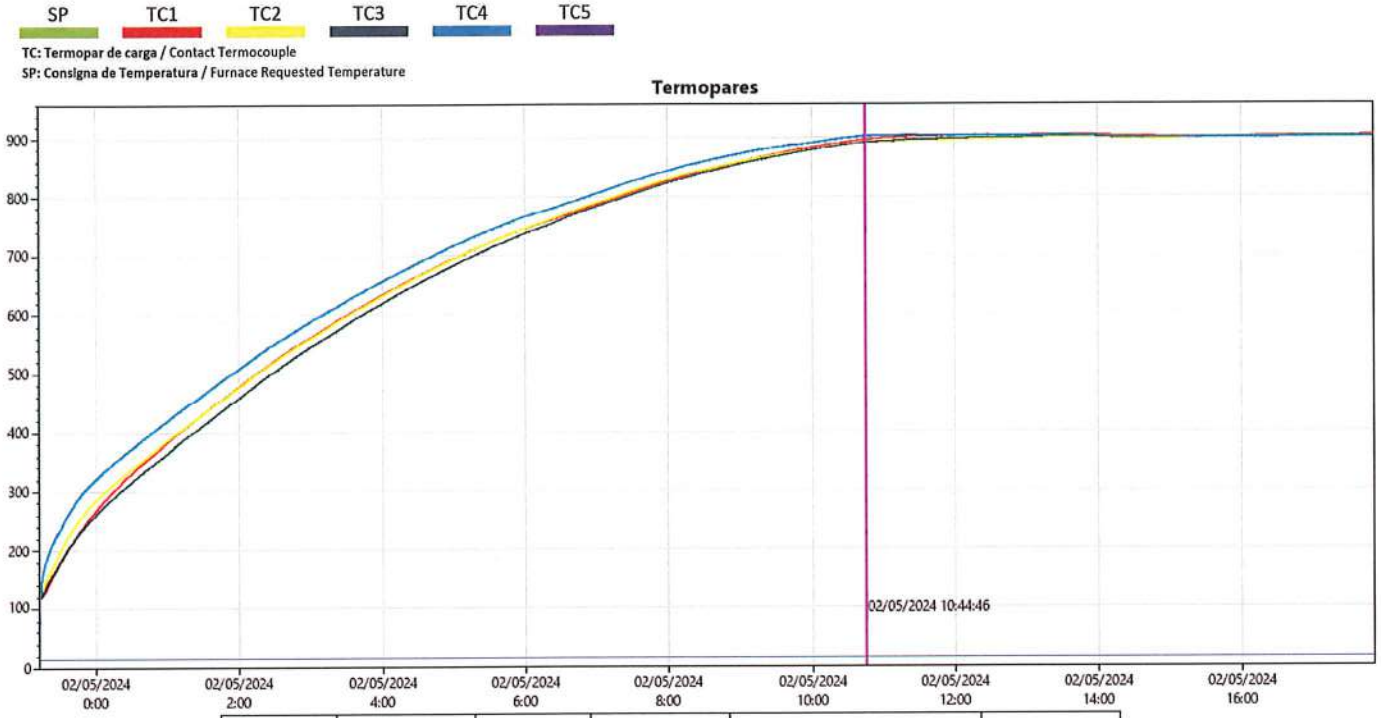
FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13./05./2024

FIHI Forging Industry S.L.

| FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

GRÁFICO DE TRATAMIENTO / TREATMENT CHART




| | | | | | |
|---|---|---|---|---|---|
| REF.TC1 | 94321-12 | REF.TC2 | 94321-24 | REF.TC3 | 94321-1 |
| REF.TC4 | 94321-11 | REF.TC5 | NO APLICA | REF. LASER OPTICO | |

Conformidad de Tratamiento Termico

Conformity of Heat Treatment

Nombre de responsable / Responsible: Jesús Arruti

| OBSERVACIONES | |
|---|---|

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13/05/2024

FIHI Forging Industry S.L.

| GRI Forges Iraeta<br>FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M5018400 | (5) | | | | | | |
| | | | | | | M5018780 | (1)* | | | | | | |
| | | | | | | M5018778 | (2)** | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | 1392810** | C/466767 | | | | | | |
| | | | | | | 1395442 | C/482505 | | | | | | |
| | | | | | TC4>>> | 1395443 | C/482505 | | | | | | |
| | | | | | TC3>>> | 1395445 | C/482504 | | | | | | |
| | | | | | | 1395444 | C/482505 | | | | | | |
| | | | | | TC2>>> | 1395446 | C/482504 | | | | | | |
| | | | | | TC1>>> | 1397272* | C/466767 | | | | | | |

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13/05/2024

FIHI Forging Industry S.L.

FIHI FORGING INDUSTRY, S.L.

Bº Txiriboga, s/n
20740 Zestoa (Gipuzkoa) SPAIN
Tel: +34 943 147645
Fax: +34 943 148059

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024415 |
|---|---|

| | | |
|---|---|---|
| FECHA DE EMISIÓN / DATE OF ISSUE: | | 09/05/2024 |
| CLIENTE | Nombre | FIHI Forging Industry, S.L. |
| | Dirección | Bº Txiriboga, s/n<br>20740 Zestoa (Gipuzkoa) SPAIN<br>Tel: +34 943 147 645 |
| PEDIDO / ORDER | | P24415 |
| FECHA DE RECEPCIÓN / DATE OF RECEIPT | | 07/05/2024 |
| REFERENCIA / REFERENCE | | B-374560 |
| MATERIAL ENSAYADO / TESTED MATERIAL: | | M5018780<br>C/466767 |

BUREAU VERITAS
BUREAU VERITAS
09 MAY 2024

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024





Information is marked as General and belongs to GRI

FIHI FORGING INDUSTRY, S.L.

Bº Txiriboga, s/n
20740 Zestoa (Gipuzkoa) SPAIN
Tel: +34 943 147645
Fax: +34 943 148059

GRI Flanges Iraeta

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024415 |
|---|---|

## CARACTERÍSITCAS MECÁNICAS / MECHANICAL PROPERTIES

| Fecha / Date | Referencia /Reference | Sentido-ubicación/ Direction-location | Ensayo de tracción / Tensile test | | | | |
|---|---|---|---|---|---|---|---|
| | | | Temperatura/ Temperature (ºC) | Diámetro/ Diameter (mm) | $R_{eH}$ / U.Y.S. (MPa) | Rm / T.S. (MPa) | A/ Elongation (%) |
| 09/05/2024 | B-374560 | Longitudinal | 21 | 10.01 | 366 | 505 | 35.6 |

Ensayo realizado según / Test carried out according to UNE-EN 6892-1:2020 Met. B y/and IN_FIR_LB_01_07

| Fecha/ Date | Referencia/ Reference | Sentido-ubicación/ Direction-location | Ensayo de flexión por choque / Charpy Impact test | | | |
|---|---|---|---|---|---|---|
| | | | Energía absorbida / Absorbed Energy , $KV_2$ (J) | | | |
| | | | Temperatura/ Temperature (ºC) | Probeta / Specimen 1 | Probeta / Specimen 2 | Probeta / Specimen 3 |
| 09/05/2024 | B-374560 | Longitudinal | -40 | 143 | 131 | 135 |
| | | Transversal | -40 | 63 | 64 | 33 |

Ensayo realizado según / Test carried out according to UNE-EN ISO 148-1:2017 y/ and IN_FIR_LB_01_06

| Fecha / Date | Referencia / Reference | Ensayo de tracción en sentido del espesor / through thickness tensile test (Z) | | | |
|---|---|---|---|---|---|
| | | Temperatura / Temperature (ºC) | Probeta / Specimen | Diámetro / Diameter (mm) | Estricción / Area reduction (%) |
| 09/05/2024 | B-374560 | 22 | 1 | 9.98 | 66 |
| | | 22 | 2 | 10.05 | 67 |
| | | 22 | 3 | 10.05 | 67 |

Ensayo realizado según / Test carried out according to UNE-EN ISO 6892-1:2020 Met.B, UNE-EN 10164:2019 y/ and IN_FIR_LB_01_07

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024

BUREAU VERITAS





Information is marked as General and belongs to GRI

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GRI Flanges Iraeta

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024415 |
|---|---|

## ANALISIS QUÍMICO / CHEMICAL ANALYSIS

| Fecha / Date | Referencia / Reference | Composición / Composition (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | C | Si | Mn | P | S | Cr | Mo |
| 09/05/2024 | B-374560 | 0.159 | 0.32 | 1.27 | 0.012 | 0.009 | 0.11 | 0.016 |
| | C/466767* | 0.147 | 0.32 | 1.33 | 0.013 | 0.009 | 0.11 | 0.02 |
| **Fecha / Date** | **Referencia / Reference** | **Ni** | **Cu** | **V** | **Al** | **Nb** | **Ti** | **N** |
| 09/05/2024 | B-374560 | 0.06 | 0.11 | 0.067 | 0.021 | 0.002 | 0.004 | 0.0081 |
| | C/466767* | 0.07 | 0.12 | 0.072 | 0.029 | 0.003 | 0.0048 | 0.0098 |

Ensayo realizado según / Test carried out according to IN_FIR_LB_01_01 y/and IN_FIR_LB_01_04

| Fecha / Date | Referencia / Reference | Parámetros calculados / Calculated parámeters | |
|---|---|---|---|
| | | $C_{EQ}$ (1) ($C_{EQ}$= C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15) (%) | $C_{ET}$ (2) ($C_{ET}$= C + (Mn+Mo)/10 + (Cr+Cu)/20 + Ni/40) (%) |
| 09/05/2024 | B-374560 | 0.422 | N/A |
| | C/466767* | 0.422 | |

(1) Parámetro calculado según / Calculated parameter according to EN-10025-1:2006

(2) Parámetro calculado según / Calculated parameter according to EN-1011-2:2001

BUREAU VERITAS

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024





Information is marked as General and belongs to GRI

FIHI FORGING INDUSTRY, S.L.

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# CERTIFICADO DE ENSAYOS

| | |
|---|---|
| INFORME NUMERO/ REPORT NUMBER: | FIHI024415 |

## OBSERVACIONES / COMMENTS

*Datos proporcionados por el proveedor / Data provided by supplier

## FIRMA / SIGNATURE

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024

[X] Witness [ ] Review
MAY 16 24
BUREAU VERITAS

Forging Industry S.L.

Cristina Iparraguirre

Responsable de laboratorio /

Laboratory responsible

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Information is marked as General and belongs to GRI

GRI Flanges Iraeta

FIHI FORGING INDUSTRY S.L

# INFORME DE INSPECCIÓN POR ULTRASONIDOS Y VISUAL
# ULTRASONIC AND VISUAL INSPECTION REPORT

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Nº de Serie** /Serial Nº: | OF:: | 5888 | M: | 2022215 | L: | 1399936 | **Cliente** / Customer: | Rosetti Marino |
| | | | | | | | **Plano Cliente** / Customer Drawing: | ST-DD-90083-R2 |
| **Descripción** / Description: | FLANGE | | | | | | | |

| | | | |
|---|---|---|---|
| **Nombre del técnico** / Name of the technician: | OIER ECEIZA | **Nivel** / Level: | 2 |
| **Organización de inspección** / Examination organization: | FIHI FORGING INDUSTRY S.L. | **Nº Certificado** / Certificate No.: | E-A-007398-UT-MS-1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Identificación del equipo de inspección** / Identification of used equipment: | | | | OLYMPUS - EPOCH | | | |
| **Identificación de bloque de referencia empleado** / Identification of used reference block (s) | | | | | | | |
| **V1-No.:** | 12545 | **V2-No.:** | 50434-20398 | **TIF-Block No.:** | FI-UT-BI | **Other:** | |
| **Verificación de palpadores** / Probe check | | ☒ OK | ☐ NO OK | **Acoplante** / Couplant: | | ACEITE / OIL | |

**Información palpadores utilizados (tipo, nº identificación, frecuencia y ángulo real de salida del palpador** / Information of used probes (type, ID number, frecuency and the probes angle

| Palpador / Probe | Tipo Palpador / Probe type | Nº Identificación / Id. No. | Frec. ángulo / Freq angle | Palpador / Probe | Tipo Palpador / Probe type | Nº Identificación / Id. No. | Frec. ángulo / Freq angle |
|---|---|---|---|---|---|---|---|
| Probe "A" | B4S | 57746 | 4 Mhz / 0 ° | Probe "B" | DL4R | 1481248 | 4 Mhz /0 ° |
| Probe "C" | SWB45-2 | 58414-53756 | 2 Mhz /45° | Probe "D" | SWB70 -2 | 58416-54064 | 2 Mhz / 70 ° |
| Probe "E" | | | | Probe "F" | | | |

**Normas a aplicar** / Standards to be apply

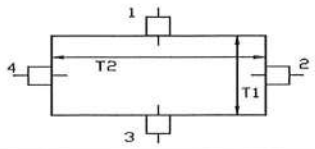
| Criterio de aceptación material base / Base material aceptance criteria | Criterio de aceptación Soldadura / Welds aceptance criteria | Criterio de aceptación inspección visual / Visual inspections acceptance criteria |
|---|---|---|
| EN 10308 clase 3 | ISO 17640-B | ISO 17637 |
| | ISO 11666 clase 2 | EN 5817-B |
| | | |

**Ganancia empleada para el nivel de referencia y valores usados para la corrección por perdidas por transferencia** / Gain setting for reference level and values used for transfer corrections

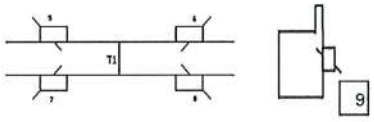
| | A: | B: | C: | D: | E: | F: |
|---|---|---|---|---|---|---|
| **ID Palpador** / Probe ID | | | | | | |
| **Método de ajuste** / Method settings (*) | 3 | 3 | 1 | 1 | | |
| **Campo aplicación** / Setting range | 300 mm | 300 mm | 300 mm | 300 mm | mm | mm |
| **Nivel de referencia** / Setting reference | (dia) 2 mm | (dia) 2 mm | (dia) 3 mm | (dia) 3 mm | (dia) mm | (dia) mm |
| **Ajuste de la base** / Basic set.-ref curve | dB | dB | 36 dB | 39 dB | dB | dB |
| **Corrección perdida transferencia** /Transfer correction | dB | dB | 2 dB | 2 dB | dB | dB |
| **Ganancia adicional para la inspección** / Extra gain for scanning | dB | dB | 14 dB | 14 dB | dB | dB |
| **TOTAL** | dB | dB | 52 dB | 55 dB | dB | dB |

**(*) Método de ajuste de la sensibilidad: 1- taladros laterales 2- Taladros de fondo plano 3- Curvas distancia amplitud (DAC)**
(*) Method for setting of the sensitivity: 1 Side drilled holes 2- Flat bottom holes 3- Distance gain size (DGS)

**Posición para la inspección de defectos longitudinales y laminación** / Scanning position for longitudinal defects and lamination




**Posición para la inspección de soldaduras** / Scanning position for weldings inspection




**Extension del examen** / Extent of examination

| Tipo de insp. / Type of insp. (2) | Espesor 1 / Thickness 1 | Espesor 2 / Thickness 2 | Palpador – Posición palpador / Probe- probe position | Área de inspección/ Inspection area |
|---|---|---|---|---|
| 2 | 120-280 mm | mm | C5/C6 - C7/C8 - D5/D6 - D7/D8 - C9 / D9 | 100% |
| 3 | 120-280 mm | 325 mm | A1/A2 - B1/B2 | 100% |
| | mm | mm | | % |
| | mm | mm | | % |

**2) Tipo de inspección: 1: Insp. de aros laminados de sección rectangular 2: Insp. de las soldaduras 3: Insp. de aro fabricado en llanta de sección rectangular**
2) Type of inspection: 1: Insp. of the seamless rolled ring with rectangular cross section 2: Insp. of the weld in the steel bar 3: Insp. of the ring made out of bars with rectangular cross section

**Resultado de la inspección y marcas** / Result of the examination and remarks:
☒ **ACEPTABLE** / ACCEPTABLE
☐ **NO ACEPTABLE** / NOT ACCEPTABLE

**Firma Inspector** / Technician signature: FIHI Forging Industry S.L.

**Fecha** / Date: 8/05/2024

**Responsable de NDT y supervisor** / NDT responsible and supervisor:
Urtzi Landa : E - A - 004708 - UT - 2 - MS - 2

**Firma supervisor** / Supervisor Signature: FIHI Forging Industry S.L.

F_FIR_IP_01_01_01_R0
FECHA REV. DOC.: 06/03/2023

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 10/05/2024

GRI Flanges Iraeta

FIHI FORGING INDUSTRY SL

# INFORME DE INSPECCIÓN POR MT y VT
# INSPECTION REPORT OF MT AND VT

| | | | | |
|---|---|---|---|---|
| **Nº de Serie** /Serial Nº: | OF: 5888 | M: 2022215 | L: 1399936 | **Cliente** / Customer: Rosetti Marino |
| | | | | **NºPlano Cliente** / Customer Drawing Nº: ST-DD-90083-R2 |
| **Descripción** / Description: | FLANGE | | | |

## INFORME DE INSPECCIÓN POR PARTÍCULAS MAGNÉTICAS
MAGNETIC TESTING INSPECTION REPORT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Normativa** / Standard: ISO 23278 2x / ISO 17638 | | | | **Preparación superficial** / Surface finish: Mecanizado/ Machined | | | |
| **Partículas Magnéticas** / Magnetic particles: NEGRAS / BLACK | | **Fabricante** / Manufacturer: CGM | | **Referencia** / Reference: LK31 - 355 | | **Color** / Colour: NEGRO / BLACK | |
| **Aparato utilizado** / Type of machine: YUGO ELECTROMAGNETICO / YOKE ELECTROMAGNETIC | | **Fabricante** / Manufacturer: YUKE MAGIFLUS | | **Modelo** / Model: TWIST 230 | | **Nº Serie** / Serial number: A : 903823 VOLT : 280428 | |
| **Método de limpieza** / Method of cleaning: DESENGRASADO DEGREASED | **Laca de contraste** / Strip film contrast: SI YES | | **Secuencia magnetización** / Sequence of magnetization: CONTINUO CONTINUE | | **Temperatura de la pieza** / Piece temperatura: 10 - 50 °C | | |
| **Iluminación** / Ilumination: NATURAL NATURAL | **Duración de la magnetización** / Duration of Magnetization: 5 - 10 sg | | **Corriente de magnetización** / Flow of magnetization: ALTERNA ALTERNATE | | **Intensidad (kv)** / Strenght: 3,8 K/A | | |
| **Luxómetro (lux)** / Luxometer (lux): > 500 LUX | **Relación L/D** / Relation L/D: N.A | **Amperio –Vuelta** / Ampere-lap: N.A | **Distancia Polos (mm)** / Distance Poles: 150 - 250 | | **Fuerza Izado (Kg)** / Lifting Power: 4,5 | | |
| **Material de contacto** / Type of contact: ACERO STEEL | **Desmagnetización** / Demagnetization: NO PRECISA NOT NECESSARY | | **Inspección al 100% de la zona de la soldadura + ZAT** Inspection of the 100% of the Weld area + HAZ | | | | |

| | | | |
|---|---|---|---|
| **Resultado** / Results: ☒ ACEPTABLE / ACCEPTABLE ☐ NO ACEPTABLE / NOT ACCEPTABLE | **Observaciones** / Observations: | | |
| **Operador** / Operator: OIER ECEIZA E-A-007398-MT-2-S-1 | **Nivel** / Level: 2 | **Firma** / Signature: FIHI Forging Industry S.L. | |
| **Supervisor** / Supervisor: URTZI LANDA : E - A - 004708 - MT - 2 - S - 2 | **Nivel** / Level: 2 | **Firma** / Signature: FIHI Forging Industry S.L. | **Fecha** / Date: 10/05/2024 |

## INFORME DE INSPECCIÓN VISUAL
VISUAL TESTING INSPECTION REPORT

| | | | |
|---|---|---|---|
| **Normativa** / Standard: ISO 5817-B / ISO 17637 | | **Periodo de inspección** / Time of examination: DESPUES DE MECANIZAR AFTER MACHINING | |
| **Instrumentación** / Aids: REGLA / RULER (mm) | | | |
| **Extensión de la inspección** / Extent of examination: SOLDADURA + ZAT WELD + HAZ | | **Condiciones superficiales** / Surface conditions: MECANIZADO MACHINED | |
| **Resultado** / Results: ☒ ACEPTABLE / ACCEPTABLE ☐ NO ACEPTABLE / NOT ACCEPTABLE | **Observaciones** / Observations: | | |
| **Operador** / Operator: OIER ECEIZA E-A-007398-VT-2-S-1 | **Nivel** / Level: 2 | **Firma** / Signature: FIHI Forging Industry S.L. | |
| **Supervisor** / Supervisor: URTZI LANDA : E - A - 004708 - VT - 2 - MS - 2 | **Nivel** / Level: 2 | **Firma** / Signature: FIHI Forging Industry S.L. | **Fecha** / Date: 10/05/2024 |



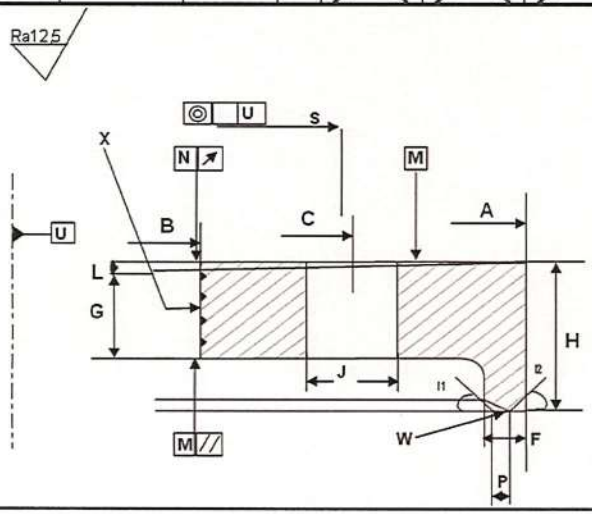
FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 10 / 05 / 2024

| FIHI FORGING INDUSTRY, S.L. | **Registro de Control Dimensional Brida en "L"**<br>*Register of Dimentional Control Flange in "L"* | |
|---|---|---|

**Nº de albarán/** *Delivery note:* 200147404/10 | **Nº Colada/** *Heat Nº:* 466767 | F_FIR_PT_05_02_R0 14/11/2019

**Nº de plano/***Item nº:* 123A90-DDL-ST-DD-90083 | **Cód.Material/***Material code:* 2022215 | **Nº de piezas/***Qty.:* 1 UN

| | | | | Ø Exter.<br>*Outside Ø*<br>A | Ø Inter.<br>*Inside Ø*<br>B | Ø Entrecen.<br>*Hole Circle Ø*<br>C | Esp.Cuello<br>*Neck width*<br>F | Altura Ala<br>*Thickness ins.*<br>G | Alt. Pieza<br>*Height*<br>H | Angulo Chaflan(°)<br>*Chamfer angle(°)*<br>I1 | <br><br>I2 | Ancho talón<br>*Bead width*<br>P | Ø Agujeros<br>*Hole diameter*<br>J | Nº Agujeros<br>*Holes Nº*<br>K1 | Dis.Pared ext.<br>*Outside wall distance*<br> | Conicidad<br>*Tilt*<br>L | Paralelism<br>*Parallelism*<br>M | Planitud<br>*Flatness*<br>N | Rugosida<br>*Roughness*<br>Ra | Muesca<br>*Marcs*<br>W | Marca alineam.<br>*Align. marc*<br>X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COTAS mm | | 7000,00 | 6350,00 | 6681,00 | 75,00 | 120,00 | 280,00 | 15,00 | 15,00 | 5,00 | 70,00 | 156 | 124,50 | N.A. | 0,00 | 0,00 | N.A. | N.A. | |
| | | TOLERANCIAS<br>*Tolerances* | | + 2,00<br>- 2,00 | + 2,00<br>- 2,00 | + 2,00<br>- 2,00 | + 1,00<br>- 0,00 | + 0,00<br>- 5,00 | + 2,00<br>- 1,00 | + 1,00<br>- 1,00 | + 1,00<br>- 1,00 | + 1,00<br>- 1,00 | + 0,50<br>- 0,50 | + 0<br>- 0 | + 2,25<br>- 2,25 | + N.A.<br>- N.A. | + 0,50<br>- 0,00 | + 2,00<br>- 0,00 | N.A.<br>N.A. | N.A.<br>N.A. | 0<br>0 |
| Nº Operario<br>*Worker Nº* | Nº Brida<br>*Flange Nº* | FECHA<br>*Date* | Máx. | 7002,00 | 6352,00 | 6683,00 | 76,00 | 120,00 | 282,00 | 16,00 | 16,00 | 6,00 | 70,50 | 156 | 126,75 | N.A. | 0,50 | 2,00 | OK/<br>NO OK | OK/<br>NO OK/<br>*NA | |
| | | | Mín. | 6998,00 | 6348,00 | 6679,00 | 75,00 | 115,00 | 279,00 | 14,00 | 14,00 | 4,00 | 69,50 | 156 | 122,25 | N.A. | 0,00 | 0,00 | | | |
| 126<br>72<br>521 | 1399936 | 10.05.2024 | 0° | 7001,58 | 6349,70 | 6681,10 | 75,73 | 119,19 | 281,54 | 15,00 | 15,00 | 4,73 | 70,05 | 156 | 125,21 | | 0,50 | 0,22 | | | OK |
| | | | 90° | 7001,83 | 6349,95 | 6681,28 | 75,50 | 119,40 | 281,70 | | | 4,63 | 70,01 | | 125,02 | | | | | | |
| | | | 180° | | | | 75,90 | 118,90 | 281,20 | | | 4,78 | 69,93 | | 125,31 | | | | | | |
| | | | 270° | | | | 75,84 | 119,29 | 281,62 | | | 4,68 | 70,05 | | 125,03 | | | | | | |
| | | | 0° | | | | | | | | | | | | | | | | | | |
| | | | 90° | | | | | | | | | | | | | | | | | | |
| | | | 180° | | | | | | | | | | | | | | | | | | |
| | | | 270° | | | | | | | | | | | | | | | | | | |




**Observaciones/** *Remarks:*

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 13/05/2024

**Aceptado por el Departamento de Calidad**

**Nombre/** *Name:*
Nora Lasa

**Firma y Sello/** *Signature and stamp:*

FIHI Forging Industry S.L.

**Fecha/** *Date:*
10.05.2024

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

# QUALITY CERTIFICATE / CERTIFICADO CALIDAD

## EN10204 3.2

| | | | | | |
|---|---|---|---|---|---|
| **Nº Certificado:** Certificate Nº: | 040000374468_06 | **Fecha:** Date: | 13.05.2024 | **Nº Cert. Ensayo:** Test Cert. Nº: | FIHI024426 |
| **Cliente:** Customer: | ROSETTI MARINO S.P.A. | **Nº Pedido:** Order Nº: | 1724000344 123A90A | **Nº Albarán:** Delivery Note Nº: | 200147415/10 |
| **Nº Plano Cliente:** Customer Drawing Nº: | TEST COUPON | | | **Cod. Artículo:** Article Code: | 2022233 |
| **Material:** Material: | EN10025-3-S420NL | **Trat. Térmico:** Heat Treatment: | H5-0379 NORMALIZADO (+N) NORMALIZED (+N) | **Estado Suministro:** Delivery Condition: | MECANIZADO MACHINED |

| Cantidad Quantity | Descripción Artículos Articles description | Nº Colada Heat Nº | (1)Ref. Probeta(2) (1)Testing Piece Ref.(2) | Observaciones Observations |
|---|---|---|---|---|
| 1 | TEST COUPON -320x105x1400 (S420NL)-NL0S<br>Ref. Test Cupón (Test Coupon) M-2022233 L/SN-1400646 | 466767 | (EP)1392810-L (M)<br>(T1)1392810(M)<br>(T2)1392810 (M) | |

(1) TIPO PROBETA/*Type:* -EP: TOCHO/*End Piece* -R: ARANDELA/*Ring* -C: CUPÓN/*Coupon*

(2) SITUACIÓN/*Location:* -M: MATERIAL BASE/*Base Material* -W: SOLDADURA/*Welding* -H: ZAT/*HAZ*

## COMPOSICIÓN QUÍMICA (%) / CHEMICAL COMPOSITION (%)

| Ref. Probeta *Testing Piece Ref.* | (3) | C | Si | Mn | P | S | Nb | V | Al (4) | Ti | Cr | Ni | Mo | Cu | N | B | O | CEV (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 466767 | L | 0,1470 | 0,3200 | 1,3300 | 0,0130 | 0,0090 | 0,0030 | 0,0720 | 0,0290 | 0,0048 | 0,1100 | 0,0700 | 0,0200 | 0,1200 | 0,0098 | - | - | 0,4220 |
| (EP)1392810-L (M) | P | 0,1610 | 0,3100 | 1,2800 | 0,0120 | 0,0100 | 0,0020 | 0,0680 | 0,0210 | 0,0040 | 0,1100 | 0,0600 | 0,0160 | 0,1100 | 0,0058 | - | - | 0,4260 |

(3) L = ANÁLISIS DE COLADA/ *Laddle Analysis*
P = ANÁLISIS DE PRODUCTO/ *Product Analysis*

(5) CEV% (EN-10025-1) = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15

(4)Si la cantidad de elementos fijadores del N es suficiente (Nb:0.015-0.06% o V: 0.02-0.12%), la cantidad mínima de Al no aplica (material acorde a EN10025/EN10028/EN10273) /The minimum value for aluminium does not apply if other N binding elements are present in sufficient quantity (Nb: 0.015-0.06% or V: 0.02-0.12%). (Materials according to EN10025/EN10028/EN10273)

## CARACTERÍSTICAS MECÁNICAS / TAMAÑO GRANO - MECHANICAL PROPERTIES / GRAIN SIZE

| Ref. Probeta *Testing Piece Ref.* | Ensayo de Tracción *Tensile Test* (ISO 6892-1) | | | | Estricción (%) *Reduction of Area (%)* (EN 10164) | | | Resistencia al Impacto KV2 *Impact Strength KV2* (ISO 148-1) | | | | Dureza *Hardness* | Tamaño de Grano *Grain Size* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (6) | Resist. Tracción *Tensile Strength* Rm MPa | Límite Elástico *Yield Strength* ReH MPa | Alargamiento *Elongation* Lo=5d A % | (6) | Valores Unitarios *Unitary values* % | Media *Average* % | (6) | Valores Unitarios *Unitary Values* J | Media *Average* J | Temp./ *Temp.* °C | HBW (ISO 6506-1) | (ASTM E-112) |
| (EP)1392810-L (M) | L | 519 | 357 | 32,2 | Z | 66-63-63 | 64 | L | 167-139-144 - | 150 - | -40 | - | - |
| (T1)1392810 (M) | - | - | - | - | - | - | - | T1 | 53-64-71 - | 63 - | -40 | - | - |
| (T2)1392810 (M) | - | - | - | - | - | - | - | T2 | 54-49-47 - | 50 - | -40 | - | - |

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 13 / 05 / 2024

(6) ORIENTACIÓN / *Orientation:* -T: TRANSVERSAL/*Transversal* -L: LONGITUDINAL/*Longitudinal* -Z: SENTIDO DEL ESPESOR/*Through thickness.*

**DECLARACIÓN DE CONFORMIDAD** *DECLARATION OF CONFORMITY:*

LOS PRODUCTOS INCLUIDOS EN EL PRESENTE DOCUMENTO SON CONFORMES CON LOS REQUISITOS DEL PEDIDO DE CLIENTE Y CON LOS DE LA(S) NORMA(S) DEL MATERIAL ARRIBA REFERIDO(S)

*The product herein in this document has been made and tested in accordance with the requirements of the above mentioned order and standard.*

**VALIDADO POR**
*VALIDATED BY:*

**Departamento de Calidad:**
*Quality department:*

Nora Lasa

BUREAU VERITAS
D.Herrera-Davila
13/May/2024

UK CA 2400
2400-CPR-20220126

CE 2451
2451-CPR-EN10025-2014.0001

FIHI Forging Industry S.L.

*Environmental recommendations related to the product: At GRI Renewables we understand caring for the environment as a responsible management model in collaboration with our stakeholders, therefore, and with the aim of reducing the environmental impact of our activity and, therefore,of our production chain, we recommend to our clients and to all the parties involved in our life cycle, carry out a correct segregation and treatment of the waste generated, prioritizing its minimization, reuseand recycling, in accordance with the applicable legislation.*

FIHI FORGING INDUSTRY, S.L.

# Declaration of performance

The manufacturer

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa) SPAIN**

declares herewith, that the construction product

**Test coupons produced by hot rolled products of structural steel according to EN 10025-1** with serial number

M-2022233 L-1400646

produced in factory

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa) SPAIN**

fulfills the requirements of the following EU-directive/s and harmonized specifications:

- **EN 10025-1**
- **EU 305**
- **EN 1090-1**
- **EN 1090-2 EXC 4**

The notified body/ies:

- **UKAS CPR: certified by TWI Certification Ltd /Notified body No. 2400 / Certificate No. 2400-CPR-20220126**
- **CE CPR: certified by DVS ZERT / Notified body No.2451 / Certificate No. 2451-CPR-EN10025-2014.0001.006**

And with customers specifications and drawings according to Purhase Order 1724000344

| DRAWING | SPECIFICATION |
|---|---|
| TEST CUPÓN | 123A90-DDL-ST-SP-90118 Document Class: 2 Rev.1, SPC-PRO-01Rev.2024-00, 123A90-DDL-ST-SP-90118_IFA REV.02 (05032024) |

The performance of the products above is in conformity with the set of declared performance/s. This declaration of performance is issued in accordance with Regulation (EU) No 305/2011/EU and Construction products (amendment etc.) (EU exit) Regulations 2020, UK statutory instrument 2020, under the sole responsibility of the manufacturer identified above.

Zestoa, 13.05.2024
FIHI FORGING INDUSTRY S.L

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13./05./2024

FIHI Forging Industry S.L.

*FIHI FORGING INDUSTRY S.L*
*Meagako errepidea, 10*
*20740 Zestoa (Gipuzkoa) SPAIN*

*Business ID /C.I.F.*
*B75225946*

*www.grupoiraeta.com*
***Tel.*** *+34 943 147 645*
***Fax.*** *+34 943 897 029*

Information is marked as Restricted and belongs to GRI.

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

CE 2451

UKCA 2400

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa)**
**SPAIN**
**08 - 22**
2451-CPR-EN10025-2014.0001.006
2400-CPR-20220126

**EN 10025-1**
Hot rolled products of structural steels

| | |
|---|---|
| Intended uses: | Building constructions or civil engineering |
| Tolerances on dimensions and shape: | Welded parts EN 10029 Class A |
| Elongation: | Normalized Steel EN 10025-3 S420NL |
| Tensile strength | |
| Yield strength | |
| Impact strength | |
| Weldability | |
| Durability: | NPD. |
| Regulated substance: | NPD. |



FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

Information is marked as Restricted and belongs to GRI.

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

**CE & UKCA Marking used for Inspection Certificates according to EN 10204**

CE

2451

2451-CPR-EN10025-2014.0001.006

UK CA

2400

2400-CPR-20220126

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13/05/2024

*FIHI FORGING INDUSTRY S.L*
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Information is marked as Restricted and belongs to GRI.

ACCIAIERIE BERTOLI SAFAU
ABSOLUTE STEEL QUALITY

ACCIAIERIE BERTOLI SAFAU SpA
Via Buttrio n.28 - Frazione Cargnacco - 33050 Pozzuolo del Friuli (UD)
Tel. +39 0432 613211 - Fax +39 0432 613209 - www.absacciai.it

# CERTIFICATO DI COLLAUDO

Inspection Certificate 3.1/Certificat de reception 3.1/
Abnahmeprufzeugnis 3.1

| | |
|---|---|
| N. | 291974 / 1 |
| Data | 08.06.2021 |
| COLATA N. Heat-Couée-Schmelze | 466767 |
| Pag. | 1 / 1 |

| | | | |
|---|---|---|---|
| CLIENTE Customer-Client-Besteller | FIHI FORGING INDUSTRY S.L. | ORDINE Order-Commande-Bestellung | 4500252451 |
| PROFILO Shape-Section-Profili | CONTINUOUS CAST ROUND BARS , 600 MM - | STATO DI FORNITURA SupplyCondition-Etat de livraison | UNTREATED |
| ACCIAIO Steel-Acier-Stahl | S420 | COMESSA/POS Sales Order/Pos: | 1075944/10 |

CAPITOLATO ABS: Technical Specification: ABS

CAPITOLATO DI ANALISI: Material Specification: FORJAS IRAETA SP_FIR_DP_01_03_R0 03/09/2020

CAPITOLATO DI FORNITURA: Technical Delivery Requirements:

**COMPOSIZIONE CHIMICA DI COLATA %**

CAST ANALYSIS % - COMPOSITION CHIMIQUE DE COULEE % - SCHMELZE CHEMISCHE ANALYSE %

| | C | Mn | Si | P | S | Cr | Ni | Mo | Al (T) | Cu | Sn | Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min | | 1,00 | | | | | | | 0,015 | | | |
| Max | 0,200 | 1,70 | 0,60 | 0,025 | 0,010 | 0,30 | 0,80 | 0,10 | 0,300 | 0,55 | 0,100 | 0,0500 |
| Colata/Heat | 0,147 | 1,33 | 0,32 | 0,013 | 0,009 | 0,11 | 0,07 | 0,02 | 0,029 | 0,12 | 0,006 | 0,0048 |
| | B (T) | V | Nb | As | Ca | Sb | Co | O/ppm | H/ppm | N/ppm | C EQ. LONG FORMULA | H1 TUNDISH |
| Min | | | | | | | | | | | | |
| Max | 0,0008 | 0,200 | 0,050 | 0,100 | 0,1000 | 0,100 | 0,300 | 20,00 | 2,00 | 250 | 0,460 | 2,0 |
| Colata/Heat | 0,0001 | 0,072 | 0,003 | 0,004 | 0,0014 | 0,001 | 0,009 | 8,00 | 0,70 | 98 | 0,422 | 1,7 |

**COMPOSIZIONE CHIMICA SOLIDO%**

CHEMICAL ANALYSIS II % - COMPOSITION CHIMIQUE II % - CHEMISCHE ZUSAMMENSETZUNG II %

| | C | Mn | Si | P | S | Cr | Ni | Mo | Al (T) | Cu | Sn | Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min | | | | | | | | | | | | |
| Max | | | | | | | | | | | | |
| Colata/Heat | 0,145 | 1,34 | 0,32 | 0,013 | 0,009 | 0,11 | 0,07 | 0,02 | 0,029 | 0,12 | 0,006 | 0,0046 |
| | B (T) | V | Nb | As | Ca | Sb | Co | C Eq. Formula | | | | |
| Min | | | | | | | | | | | | |
| Max | | | | | | | | | | | | |
| Colata/Heat | 0,0001 | 0,069 | 0,003 | 0,004 | 0,0014 | 0,001 | 0,009 | 0,421 | | | | |

**CARATT. MECCANICHE**

MECHANICAL PROPERTIES - CARACTERISTIQUES MECANIQUE - MECHANISCHE EIGSNSCHAFTER

TRATTAMENTO TERMICO HEAT TREATMENT

**NOTE**

ANTIMIX 100 %

TEST CERTIFICATE ISSUED ACCORDING TO: EN 10204/3.1

"NO WELDING REPAIRS"

COUNTRY OF ORIGIN : ITALY

VACUUM DEGASSED STEEL .

ELECTRIC ARC FURNACE STEEL .

FINE GRAIN STEEL .

FULLY KILLED .

- Material free from lead, mercury, cadmium and hexavalent chromium (dir. 2000/53/CE - dir. 2011/65/UE as amended)
- Material with radioactivity not exceeding 0,1Bq/g (d.lgs. 230/1995 as amended)

**CONTROLLO QUALITA'**

QUALITY CONTROL - CONTROLE DE QUALITE - QUALITATSSTEILE

Company with a management system certified by IGQ to
ISO 9001 and IATF 16949

Verif.:Omar Tonetti

FRANCESCO PARISE
GNGINEX Inspector on behalf of: ROSSETTI MARINO

W ☐

R ☑

DATE: 13 / 05 / 2024

FIHI
Forging Industry S.L.

| FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

| HORNO / FURNACE: | HO-05 | Nº HORNADA / TREATMENT Nº: | H5-0379 | MATERIAL / MATERIAL: | Aro |
|---|---|---|---|---|---|
| FECHA INICIO / STARTING DATE: | 01/05/2024 23:13:00 | FECHA FINAL / FINISHING DATE: | 02/05/2024 17:53:09 | PESO / WEIGHT [Kg]: | 79175 |
| PERMANENCIA REAL / REAL HOLDING TIME [min]: | 429 | PERMANENCIA PREVISTA / SCHEDULED HOLDING TIME [min]: | 420 | MAYOR ESPESOR / MAX. THICKNESS [mm]: | 305 |

| DESCRIPCIÓN MATERIAL<br>MATERIAL DESCRIPTION | BATCH | ESPESOR (mm) /<br>THICKNESS (mm) |
|---|---|---|
| M5018400 C/482504 (UND 2) | B-373312 | 240 |
| M5018400 C/482505 (UND 3) | B-373311 | 240 |
| M5018780 C/466767 (UND 1)(PROB 1) | B-374560 | 305 |
| 320x105x1400 C/466767(UND 2) (PROB 1) | L-1392810 | 105 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |

FIHI FORGING INDUSTRY, S.L. certifica que el material detallado en el presente documento, ha sido sometido al tratamiento térmico según la especificación que se detalla en este documento

FIHI FORGING INDUSTRY, S.L. certifies that the detailed material of this document has been treated according the especification below referenced.

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

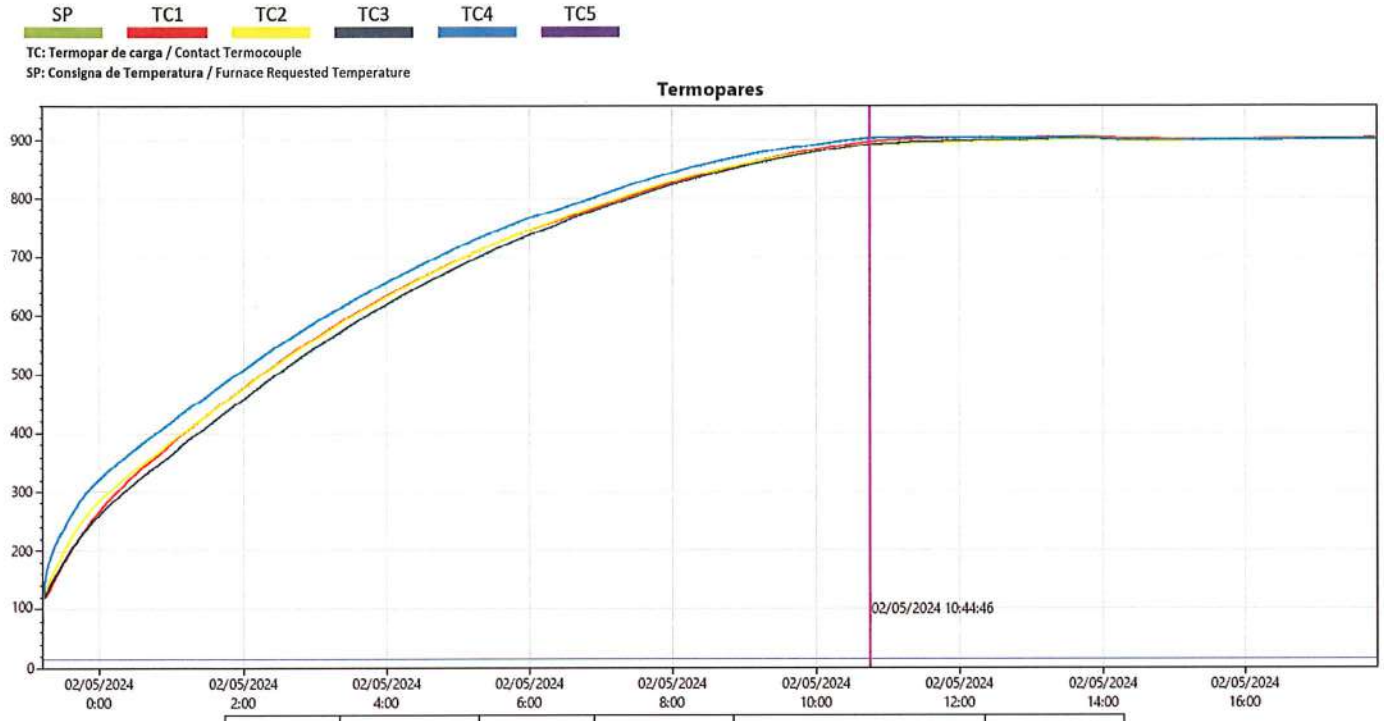
| ESPECIFICACIÓN DE TRATAMIENTO TÉRMICO / SPECIFICATION FOR HEAT TREATMENT | Normalizado según / Normalized according IN_FIR_PT_04/10/24 |
|---|---|

FIHI Forging Industry S.L.

| FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

GRÁFICO DE TRATAMIENTO / TREATMENT CHART




| | | | | | |
|---|---|---|---|---|---|
| REF.TC1 | 94321-12 | REF.TC2 | 94321-24 | REF.TC3 | 94321-1 |
| REF.TC4 | 94321-11 | REF.TC5 | NO APLICA | REF. LASER OPTICO | |

Conformidad de Tratamiento Termico

Conformity of Heat Treatment

Nombre de responsable / Responsible: Jesús Arruti

| OBSERVACIONES | |
|---|---|

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

FIHI Forging Industry S.L.

| GRI Forges Iraeta<br>FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M5018400 | (5) | | | | | | |
| | | | | | | M5018780 | (1)* | | | | | | |
| | | | | | | M5018778 | (2)** | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | 1392810** | C/466767 | | | | | | |
| | | | | | | 1395442 | C/482505 | | | | | | |
| | | | | | TC4>>> | 1395443 | C/482505 | | | | | | |
| | | | | | TC3>>> | 1395445 | C/482504 | | | | | | |
| | | | | | | 1395444 | C/482505 | | | | | | |
| | | | | | TC2>>> | 1395446 | C/482504 | | | | | | |
| | | | | | TC1>>> | 1397272* | C/466767 | | | | | | |

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

FIHI Forging Industry S.L.

FIHI FORGING INDUSTRY, S.L.

Bº Txiriboga, s/n
20740 Zestoa (Gipuzkoa) SPAIN
Tel: +34 943 147645
Fax: +34 943 148059

GRI Flanges Iraeta

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |
|---|---|

| | | |
|---|---|---|
| FECHA DE EMISIÓN / DATE OF ISSUE: | | 09/05/2024 |
| CLIENTE | Nombre | FIHI Forging Industry, S.L. |
| | Dirección | Bº Txiriboga, s/n<br>20740 Zestoa (Gipuzkoa) SPAIN<br>Tel: +34 943 147 645 |
| PEDIDO / ORDER | | P24426 |
| FECHA DE RECEPCIÓN / DATE OF RECEIPT | | 08/05/2024 |
| REFERENCIA / REFERENCE | | L-1392810 |
| MATERIAL ENSAYADO / TESTED MATERIAL: | | M5018778<br>C/466767 |

Witness / Review
D. Javier Dávila
09 MAY 2024
BUREAU VERITAS

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024





Information is marked as General and belongs to GRI

FIHI FORGING INDUSTRY, S.L.

Bº Txiriboga, s/n
20740 Zestoa (Gipuzkoa) SPAIN
Tel: +34 943 147645
Fax: +34 943 148059

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |
|---|---|

## CARACTERÍSITCAS MECÁNICAS / MECHANICAL PROPERTIES

| Fecha / Date | Referencia /Reference | Sentido-ubicación/ Direction-location | Ensayo de tracción / Tensile test | | | | |
|---|---|---|---|---|---|---|---|
| | | | Temperatura/ Temperature (ºC) | Diámetro/ Diameter (mm) | $R_{eH}$/ U.Y.S. (MPa) | Rm / T.S. (MPa) | A/ Elongation (%) |
| 09/05/2024 | L-1392810 | Longitudinal | 21 | 10.04 | 357 | 519 | 32.2 |

Ensayo realizado según / Test carried out according to UNE-EN 6892-1:2020 Met. B y/and IN_FIR_LB_01_07

| Fecha/ Date | Referencia/ Reference | Sentido-ubicación/ Direction-location | Ensayo de flexión por choque / Charpy Impact test | | | |
|---|---|---|---|---|---|---|
| | | | | Energía absorbida / Absorbed Energy , $KV_2$ (J) | | |
| | | | Temperatura/ Temperature (ºC) | Probeta / Specimen 1 | Probeta / Specimen 2 | Probeta / Specimen 3 |
| 09/05/2024 | L-1392810 | Longitudinal | -40 | 167 | 139 | 144 |
| | | Transversal (¼ espesor) | -40 | 53 | 64 | 71 |
| | | Transversal (½ espesor) | -40 | 54 | 49 | 47 |

Ensayo realizado según / Test carried out according to UNE-EN ISO 148-1:2017 y/ and IN_FIR_LB_01_06

| Fecha / Date | Referencia / Reference | Ensayo de tracción en sentido del espesor / through thickness tensile test (Z) | | | |
|---|---|---|---|---|---|
| | | Temperatura / Temperature (ºC) | Probeta / Specimen | Diámetro / Diameter (mm) | Estricción / Area reduction (%) |
| 09/05/2024 | L-1392810 | 22 | 1 | 9.95 | 66 |
| | | 22 | 2 | 10.05 | 63 |
| | | 22 | 3 | 9.98 | 63 |

Ensayo realizado según / Test carried out according to UNE-EN ISO 6892-1:2020 Met.B, UNE-EN 10164:2019 y/ and IN_FIR_LB_01_07

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024

Bureau Veritas Iberia S.L. 9 MAY 2024





Information is marked as General and belongs to GRI

FIHI FORGING INDUSTRY, S.L.

Bº Txiriboga, s/n
20740 Zestoa (Gipuzkoa) SPAIN
Tel: +34 943 147645
Fax: +34 943 148059

GRI Flanges Iraeta

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |
|---|---|

## ANALISIS QUÍMICO / CHEMICAL ANALYSIS

| Fecha / Date | Referencia / Reference | Composición / Composition (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | C | Si | Mn | P | S | Cr | Mo |
| 09/05/2024 | L-1392810 | 0.161 | 0.31 | 1.28 | 0.012 | 0.010 | 0.11 | 0.016 |
| | C/466767* | 0.147 | 0.32 | 1.33 | 0.013 | 0.009 | 0.11 | 0.02 |
| **Fecha / Date** | **Referencia / Reference** | **Ni** | **Cu** | **V** | **Al** | **Nb** | **Ti** | **N** |
| 09/05/2024 | L-1392810 | 0.06 | 0.11 | 0.068 | 0.021 | 0.002 | 0.004 | 0.0058 |
| | C/466767* | 0.07 | 0.12 | 0.072 | 0.029 | 0.003 | 0.0048 | 0.0098 |

Ensayo realizado según / Test carried out according to IN_FIR_LB_01_01 y/and IN_FIR_LB_01_04

| Fecha / Date | Referencia / Reference | Parámetros calculados / Calculated parámeters | |
|---|---|---|---|
| | | $C_{EQ}$ (1) ($C_{EQ}$= C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15) (%) | $C_{ET}$ (2) ($C_{ET}$= C + (Mn+Mo)/10 + (Cr+Cu)/20 + Ni/40) (%) |
| 09/05/2024 | L-1392810 | 0.426 | N/A |
| | C/466767* | 0.422 | |

(1) Parámetro calculado según / Calculated parameter according to EN-10025-1:2006

(2) Parámetro calculado según / Calculated parameter according to EN-1011-2:2001

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024

Witness
09 MAY 2024
BUREAU VERITAS





Information is marked as General and belongs to GRI

FIHI FORGING INDUSTRY, S.L.

Bº Txiriboga, s/n
20740 Zestoa (Gipuzkoa) SPAIN
Tel: +34 943 147645
Fax: +34 943 148059

# CERTIFICADO DE ENSAYOS

| | |
|---|---|
| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |

## OBSERVACIONES / COMMENTS

*Datos proporcionados por el proveedor / Data provided by supplier

## FIRMA / SIGNATURE

Witness

09 MAY 2024

FIHI Forging Industry S.L.

Cristina Iparraguirre

Responsable de laboratorio /

Laboratory responsible

FRANCESCO PARISE
ENGIVEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09.05.2024

Los resultados de este informe sólo afectan a las muestras sometidas a ensayo.
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The results of this report refer only to the tested samples
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F_FIR_LB_01_19_01_R2
Fecha rev. Formato: 06/06/2023

Information is marked as General and belongs to GRI

GRI Flanges Iraeta

FIHI FORGING INDUSTRY S.L

# INFORME DE INSPECCIÓN POR ULTRASONIDOS Y VISUAL
# ULTRASONIC AND VISUAL INSPECTION REPORT

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nº de Serie /Serial Nº: | OF:: | | M: | 2022233 | L: | 1400646 | Cliente / Customer: | ROSETTI MARINO S.P.A |
| | | | | | | | Plano Cliente / Customer Drawing: | TEST COUPON |
| Descripción / Description: | FLANGE | | | | | | | |

| | | | |
|---|---|---|---|
| Nombre del técnico / Name of the technician: | URTZI LANDA | Nivel / Level: | 2 |
| Organización de inspección / Examination organization: | FIHI FORGING INDUSTRY S.L. | Nº Certificado / Certificate No.: | E-A-004708-UT-2-MS-2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Identificación del equipo de inspección / Identification of used equipment: | | | | OLYMPUS - EPOCH | | | |
| Identificación de bloque de referencia empleado / Identification of used reference block (s) | | | | | | | |
| V1-No.: | 12545 | V2-No.: | 50434-20398 | TIF-Block No.: | FI-UT-BI | Other: | |
| Verificación de palpadores / Probe check | | ☒ OK | ☐ NO OK | Acoplante / Couplant: | | ACEITE / OIL | |

Información palpadores utilizados (tipo, nº identificación, frecuencia y ángulo real de salida del palpador / Information of used probes (type, ID number, frecuency and the probes angle

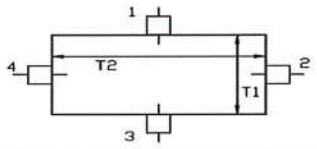
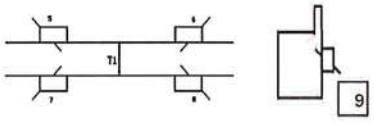
| Palpador / Probe | Tipo Palpador / Probe type | Nº Identificación / Id. No. | Frec. ángulo / Freq angle | Palpador / Probe | Tipo Palpador / Probe type | Nº Identificación / Id. No. | Frec. ángulo / Freq angle |
|---|---|---|---|---|---|---|---|
| Probe "A" | B4S | 57746 | 4 Mhz / 0 ° | Probe "B" | DL4R | 1370104 | 4 Mhz /0 ° |
| Probe "C" | SWB45-2 | 58414-52386 | 2 Mhz /45° | Probe "D" | SWB70 -2 | 58416-51812 | 2 Mhz / 70 ° |
| Probe "E" | | | | Probe "F" | | | |

| Normas a aplicar / Standards to be apply | | |
|---|---|---|
| Criterio de aceptación material base / Base material aceptance criteria | Criterio de aceptación Soldadura / Welds aceptance criteria | Criterio de aceptación inspección visual / Visual inspections acceptance criteria |
| EN 10308 clase 3 | | |
| | | |
| | | |

Ganancia empleada para el nivel de referencia y valores usados para la corrección por perdidas por transferencia / Gain setting for reference level and values used for transfer corrections

| ID Palpador / Probe ID | A: | B: | C: | D: | E: | F: |
|---|---|---|---|---|---|---|
| Método de ajuste / Method settings (*) | 3 | 3 | 1 | 1 | | |
| Campo aplicación / Setting range | 300 mm | 300 mm | 300 mm | 300 mm | mm | mm |
| Nivel de referencia / Setting reference | (dia) 2 mm | (dia) 2 mm | (dia) 3 mm | (dia) 3 mm | (dia) mm | (dia) mm |
| Ajuste de la base / Basic set.-ref curve | dB | dB | dB | dB | dB | dB |
| Corrección perdida transferencia /Transfer correction | dB | dB | 2 dB | 2 dB | dB | dB |
| Ganancia adicional para la inspección / Extra gain for scanning | dB | dB | 14 dB | 14 dB | dB | dB |
| TOTAL | dB | dB | dB | dB | dB | dB |

(*) Método de ajuste de la sensibilidad: 1- taladros laterales 2- Taladros de fondo plano 3- Curvas distancia amplitud (DAC)
(*) Method for setting of the sensitivity: 1 Side drilled holes 2- Flat bottom holes 3- Distance gain size (DGS)

| Posición para la inspección de defectos longitudinales y laminación / Scanning position for longitudinal defects and lamination | Posición para la inspección de soldaduras / Scanning position for weldings inspection |
|---|---|
|   |   |

Extension del examen / Extent of examination

| Tipo de insp. / Type of insp. (2) | Espesor 1 / Thickness 1 | Espesor 2 / Thickness 2 | Palpador – Posición palpador / Probe- probe position | Área de inspección/ Inspection area |
|---|---|---|---|---|
| 2 | 100 mm | mm | C5/C6 - C7/C8 - D5/D6 - D7/D8 - C9 / D9 | 100% |
| 3 | 100 mm | 320 mm | A1/A2 - B1/B2 | 100% |
| | mm | mm | | % |
| | mm | mm | | % |

2) Tipo de inspección: 1: Insp. de aros laminados de sección rectangular 2: Insp. de las soldaduras 3: Insp. de aro fabricado en llanta de sección rectangular
2) Type of inspection: 1: Insp. of the seamless rolled ring with rectangular cross section 2: Insp. of the weld in the steel bar 3: Insp. of the ring made out of bars with rectangular cross section

| Resultado de la inspección y marcas / Result of the examination and remarks: | Firma Inspector / Technician signature: | Fecha / Date: |
|---|---|---|
| ☒ ACEPTABLE / ACCEPTABLE<br>☐ NO ACEPTABLE / NOT ACCEPTABLE | FIHI Forging Industry S.L. | 12.04.2024 |
| Responsable de NDT y supervisor / NDT responsible and supervisor:<br>Urtzi Landa : E - A - 004708 - UT - 2 - MS - 2 | Firma supervisor / Supervisor Signature: FIHI Forging Industry S.L. | |

F_FIR_IP_01_01_01_R0
FECHA REV. DOC.: 06/03/2023

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

# QUALITY CERTIFICATE / CERTIFICADO CALIDAD

## EN10204 3.2

| | | | | | |
|---|---|---|---|---|---|
| **Nº Certificado:** Certificate Nº: | 040000374469_06 | **Fecha:** Date: | 13.05.2024 | **Nº Cert. Ensayo:** Test Cert. Nº: | FIHI024426 |
| **Cliente:** Customer: | ROSETTI MARINO S.P.A. | **Nº Pedido:** Order Nº: | 1724000344 123A90A | **Nº Albarán:** Delivery Note Nº: | 200147415/10 |
| **Nº Plano Cliente:** Customer Drawing Nº: | TEST COUPON | | | **Cod. Artículo:** Article Code: | 2022233 |
| **Material:** Material: | EN10025-3-S420NL | **Trat. Térmico:** Heat Treatment: | H5-0379 NORMALIZADO (+N) NORMALIZED (+N) | **Estado Suministro:** Delivery Condition: | MECANIZADO MACHINED |

| Cantidad Quantity | Descripción Artículos Articles description | Nº Colada Heat Nº | (1)Ref. Probeta(2) (1)Testing Piece Ref.(2) | Observaciones Observations |
|---|---|---|---|---|
| 1 | TEST COUPON -320x105x1400 (S420NL)-NL0S<br>Ref. Test Cupón (Test Coupon) M-2022233 L/SN-1400647 | 466767 | (EP)1392810-L (M)<br>(T1)1392810 (M)<br>(T2)1392810 (M) | |

(1) TIPO PROBETA/*Type:* -EP: TOCHO/*End Piece* -R: ARANDELA/*Ring* -C: CUPÓN/*Coupon*

(2) SITUACIÓN/*Location:* -M: MATERIAL BASE/*Base Material* -W: SOLDADURA/*Welding* -H: ZAT/*HAZ*

## COMPOSICIÓN QUÍMICA (%) / CHEMICAL COMPOSITION (%)

| Ref. Probeta *Testing Piece Ref.* | (3) | C | Si | Mn | P | S | Nb | V | Al (4) | Ti | Cr | Ni | Mo | Cu | N | B | O | CEV (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 466767 | L | 0,1470 | 0,3200 | 1,3300 | 0,0130 | 0,0090 | 0,0030 | 0,0720 | 0,0290 | 0,0048 | 0,1100 | 0,0700 | 0,0200 | 0,1200 | 0,0098 | - | - | 0,4220 |
| (EP)1392810-L (M) | P | 0,1610 | 0,3100 | 1,2800 | 0,0120 | 0,0100 | 0,0020 | 0,0680 | 0,0210 | 0,0040 | 0,1100 | 0,0600 | 0,0160 | 0,1100 | 0,0058 | - | - | 0,4260 |

(3) L = ANÁLISIS DE COLADA/ *Laddle Analysis*
P = ANÁLISIS DE PRODUCTO/ *Product Analysis*

(4)Si la cantidad de elementos fijadores del N es suficiente (Nb:0.015-0.06% o V: 0.02-0.12%), la cantidad mínima de Al no aplica (material acorde a EN10025/EN10028/EN10273) /The minimum value for aluminium does not apply if other N binding elements are present in sufficient quantity (Nb: 0.015-0.06% or V: 0.02-0.12%). (Materials according to EN10025/EN10028/EN10273)

(5) CEV% (EN-10025-1) = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15

## CARACTERÍSTICAS MECÁNICAS / TAMAÑO GRANO - MECHANICAL PROPERTIES / GRAIN SIZE

| Ref. Probeta *Testing Piece Ref.* | Ensayo de Tracción *Tensile Test* (ISO 6892-1) | | | | Estricción (%) *Reduction of Area (%)* (EN 10164) | | | Resistencia al Impacto KV2 *Impact Strength KV2* (ISO 148-1) | | | | Dureza *Hardness* | Tamaño de Grano *Grain Size* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (6) | Resist. Tracción *Tensile Strength* Rm MPa | Límite Elástico *Yield Strength* ReH MPa | Alargamiento *Elongation* Lo=5d A % | (6) | Valores Unitarios *Unitary values* % | Media *Average* % | (6) | Valores Unitarios *Unitary Values* J | Media *Average* J | Temp./ *Temp.* °C | HBW (ISO 6506-1) | (ASTM E-112) |
| (EP)376008-L (M) | L | 519 | 357 | 32,2 | Z | 66-63-63 | 64 | L | 167-139-144 - | 150 - | -40 | - | - |
| (T1)1392810 (M) | - | - | - | - | - | - | - | T1 | 53-64-71 - | 63 - | -40 | - | - |
| (T2)1392810 (M) | - | - | - | - | - | - | - | T2 | 54-49-47 - | 50 - | -40 | - | - |

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 13 / 05 / 2024

(6) ORIENTACIÓN / *Orientation:* -T: TRANSVERSAL/*Transversal* -L: LONGITUDINAL/*Longitudinal* -Z: SENTIDO DEL ESPESOR/*Through thickness.*

**DECLARACIÓN DE CONFORMIDAD** *DECLARATION OF CONFORMITY:*

LOS PRODUCTOS INCLUIDOS EN EL PRESENTE DOCUMENTO SON CONFORMES CON LOS REQUISITOS DEL PEDIDO DE CLIENTE Y CON LOS DE LA(S) NORMA(S) DEL MATERIAL ARRIBA REFERIDO(S)

*The product herein in this document has been made and tested in accordance with the requirements of the above mentioned order and standard.*

**VALIDADO POR**
*VALIDATED BY:*

**Departamento de Calidad:**
*Quality department:*

Nora Lasa

D.Herrera-Dávila
13/May/2024

BUREAU VERITAS 2400-CPR-20220126

UKCA 2400

CE 2451

2451-CPR-EN10025-2014.0001

FIHI Forging Industry S.L.

*Environmental recommendations related to the product: At GRI Renewables we understand caring for the environment as a responsible management model in collaboration with our stakeholders, therefore, and with the aim of reducing the environmental impact of our activity and, therefore,of our production chain, we recommend to our clients and to all the parties involved in our life cycle, carry out a correct segregation and treatment of the waste generated, prioritizing its minimization, reuseand recycling, in accordance with the applicable legislation.*

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

# Declaration of performance

The manufacturer

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa) SPAIN**

declares herewith, that the construction product

**Test coupons produced by hot rolled products of structural steel according to EN 10025-1** with serial number

M-2022233 L-1400647

produced in factory

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa) SPAIN**

fulfills the requirements of the following EU-directive/s and harmonized specifications:

- **EN 10025-1**
- **EU 305**
- **EN 1090-1**
- **EN 1090-2 EXC 4**

The notified body/ies:

- **UKAS CPR: certified by TWI Certification Ltd /Notified body No. 2400 / Certificate No. 2400-CPR-20220126**
- **CE CPR: certified by DVS ZERT / Notified body No.2451 / Certificate No. 2451-CPR-EN10025-2014.0001.006**

And with customers specifications and drawings according to Purhase Order 1724000344

| DRAWING | SPECIFICATION |
|---|---|
| TEST CUPÓN | 123A90-DDL-ST-SP-90118 Document Class: 2 Rev.1, SPC-PRO-01Rev.2024-00, 123A90-DDL-ST-SP-90118_IFA REV.02 (05032024) |

The performance of the products above is in conformity with the set of declared performance/s. This declaration of performance is issued in accordance with Regulation (EU) No 305/2011/EU and Construction products (amendment etc.) (EU exit) Regulations 2020, UK statutory instrument 2020, under the sole responsibility of the manufacturer identified above.

Zestoa, 13.05.2024
FIHI FORGING INDUSTRY S.L

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

FIHI Forging Industry S.L.

*FIHI FORGING INDUSTRY S.L*
*Meagako errepidea, 10*
*20740 Zestoa (Gipuzkoa) SPAIN*

*Business ID /C.I.F.*
*B75225946*

*www.grupoiraeta.com*
***Tel.*** *+34 943 147 645*
***Fax.*** *+34 943 897 029*

Information is marked as Restricted and belongs to GRI.

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

CE UKCA

2451 2400

**FIHI FORGING INDUSTRY S.L**
**Meagako errepidea, 10**
**20740 Zestoa (Gipuzkoa)**
**SPAIN**
**08 - 22**
2451-CPR-EN10025-2014.0001.006
2400-CPR-20220126

**EN 10025-1**
Hot rolled products of structural steels

| | |
|---|---|
| Intended uses: | Building constructions or civil engineering |
| Tolerances on dimensions and shape: | Welded parts EN 10029 Class A |
| Elongation: | |
| Tensile strength | |
| Yield strength | Normalized Steel EN 10025-3 S420NL |
| Impact strength | |
| Weldability | |
| Durability: | NPD. |
| Regulated substance: | NPD. |



FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13./05./2024

Information is marked as Restricted and belongs to GRI.

GRI Flanges Iraeta

FIHI FORGING INDUSTRY, S.L.

**CE & UKCA Marking used for Inspection Certificates according to EN 10204**

2451

2451-CPR-EN10025-2014.0001.006

2400

2400-CPR-20220126

*FIHI FORGING INDUSTRY S.L*
*Meagako errepidea, 10*
*20740 Zestoa (Gipuzkoa) SPAIN*

*Business ID /C.I.F.*
*B75225946*

*www.grupoiraeta.com*
***Tel.*** *+34 943 147 645*
***Fax.*** *+34 943 897 029*

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

Information is marked as Restricted and belongs to GRI.

ACCIAIERIE BERTOLI SAFAU
ABSOLUTE STEEL QUALITY
ACCIAIERIE BERTOLI SAFAU SpA
Via Buttrio n.28 - Frazione Cargnacco - 33050 Pozzuolo del Friuli (UD)
Tel. +39 0432 613211 - Fax +39 0432 613209 - www.absacciai.it

# CERTIFICATO DI COLLAUDO

Inspection Certificate 3.1/Certificat de reception 3.1/
Abnahmeprufzeugnis 3.1

| | |
|---|---|
| N. | 291974 / 1 |
| Data | 08.06.2021 |
| COLATA N. Heat-Couiée-Schmelze | 466767 |
| Pag. | 1 / 1 |

| | | | |
|---|---|---|---|
| CLIENTE Customer-Client-Besteller | FIHI FORGING INDUSTRY S.L. | ORDINE Order-Commande-Bestellung | 4500252451 |
| PROFILO Shape-Section-Profili | CONTINUOUS CAST ROUND BARS , 600 MM - | STATO DI FORNITURA SupplyCondition-Etat de livraison | UNTREATED |
| ACCIAIO Steel-Acier-Stahl | S420 | COMESSA/POS Sales Order/Pos: | 1075944/10 |

CAPITOLATO ABS: Technical Specification: ABS

CAPITOLATO DI ANALISI: Material Specification: FORJAS IRAETA SP_FIR_DP_01_03_R0 03/09/2020

CAPITOLATO DI FORNITURA: Technical Delivery Requirements:

**COMPOSIZIONE CHIMICA DI COLATA %**

CAST ANALYSIS % - COMPOSITION CHIMIQUE DE COULEE % - SCHMELZE CHEMISCHE ANALYSE %

| | C | Mn | Si | P | S | Cr | Ni | Mo | Al (T) | Cu | Sn | Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min | | 1,00 | | | | | | | 0,015 | | | |
| Max | 0,200 | 1,70 | 0,60 | 0,025 | 0,010 | 0,30 | 0,80 | 0,10 | 0,300 | 0,55 | 0,100 | 0,0500 |
| Colata/Heat | 0,147 | 1,33 | 0,32 | 0,013 | 0,009 | 0,11 | 0,07 | 0,02 | 0,029 | 0,12 | 0,006 | 0,0048 |
| | B (T) | V | Nb | As | Ca | Sb | Co | O/ppm | H/ppm | N/ppm | C EQ. LONG FORMULA | HI TUNDISH |
| Min | | | | | | | | | | | | |
| Max | 0,0008 | 0,200 | 0,050 | 0,100 | 0,1000 | 0,100 | 0,300 | 20,00 | 2,00 | 250 | 0,460 | 2,0 |
| Colata/Heat | 0,0001 | 0,072 | 0,003 | 0,004 | 0,0014 | 0,001 | 0,009 | 8,00 | 0,70 | 98 | 0,422 | 1,7 |

**COMPOSIZIONE CHIMICA SOLIDO%**

CHEMICAL ANALYSIS II % - COMPOSITION CHIMIQUE II % - CHEMISCHE ZUSAMMENSETZUNG II %

| | C | Mn | Si | P | S | Cr | Ni | Mo | Al (T) | Cu | Sn | Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min | | | | | | | | | | | | |
| Max | | | | | | | | | | | | |
| Colata/Heat | 0,145 | 1,34 | 0,32 | 0,013 | 0,009 | 0,11 | 0,07 | 0,02 | 0,029 | 0,12 | 0,006 | 0,0046 |
| | B (T) | V | Nb | As | Ca | Sb | Co | C Eq. Formula | | | | |
| Min | | | | | | | | | | | | |
| Max | | | | | | | | | | | | |
| Colata/Heat | 0,0001 | 0,069 | 0,003 | 0,004 | 0,0014 | 0,001 | 0,009 | 0,421 | | | | |

**CARATT. MECCANICHE**

MECHANICAL PROPERTIES - CARACTERISTIQUES MECANIQUE - MECHANISCHE EIGSNSCHAFTER

TRATTAMENTO TERMICO HEAT TREATMENT

**NOTE**

ANTIMIX 100 %

TEST CERTIFICATE ISSUED ACCORDING TO: EN 10204/3.1

"NO WELDING REPAIRS"

COUNTRY OF ORIGIN : ITALY

VACUUM DEGASSED STEEL .

ELECTRIC ARC FURNACE STEEL .

FINE GRAIN STEEL .

FULLY KILLED .

- Material free from lead, mercury, cadmium and hexavalent chromium (dir. 2000/53/CE - dir. 2011/65/UE as amended)
- Material with radioactivity not exceeding 0,1Bq/g (d.lgs. 230/1995 as amended)

**CONTROLLO QUALITA'**

QUALITY CONTROL - CONTROLE DE QUALITE - QUALITATSSTEILE

Company with a management system certified by IGQ to
ISO 9001 and IATF 16949

Verif.:Omar Tonetti

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO

W ☐
R ☑
DATE: 13./05./2021

FIHI
Forging Industry S.L.

| GRI Flonges Iraeta<br>FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

| HORNO / FURNACE: | HO-05 | Nº HORNADA / TREATMENT Nº: | H5-0379 | MATERIAL / MATERIAL: | Aro |
|---|---|---|---|---|---|
| FECHA INICIO / STARTING DATE: | 01/05/2024 23:13:00 | FECHA FINAL / FINISHING DATE: | 02/05/2024 17:53:09 | PESO / WEIGHT [Kg]: | 79175 |
| PERMANENCIA REAL / REAL HOLDING TIME [min]: | 429 | PERMANENCIA PREVISTA / SCHEDULED HOLDING TIME [min]: | 420 | MAYOR ESPESOR / MAX. THICKNESS [mm]: | 305 |

| DESCRIPCIÓN MATERIAL<br>MATERIAL DESCRIPTION | BATCH | ESPESOR (mm) /<br>THICKNESS (mm) |
|---|---|---|
| M5018400 C/482504 (UND 2) | B-373312 | 240 |
| M5018400 C/482505 (UND 3) | B-373311 | 240 |
| M5018780 C/466767 (UND 1)(PROB 1) | B-374560 | 305 |
| 320x105x1400 C/466767(UND 2) (PROB 1) | L-1392810 | 105 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |
| | | 0 |

FIHI FORGING INDUSTRY, S.L. certifica que el material detallado en el presente documento, ha sido sometido al tratamiento térmico según la especificación que se detalla en este documento

FIHI FORGING INDUSTRY, S.L. certifies that the detailed material of this document has been treated according the especification below referenced.

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024

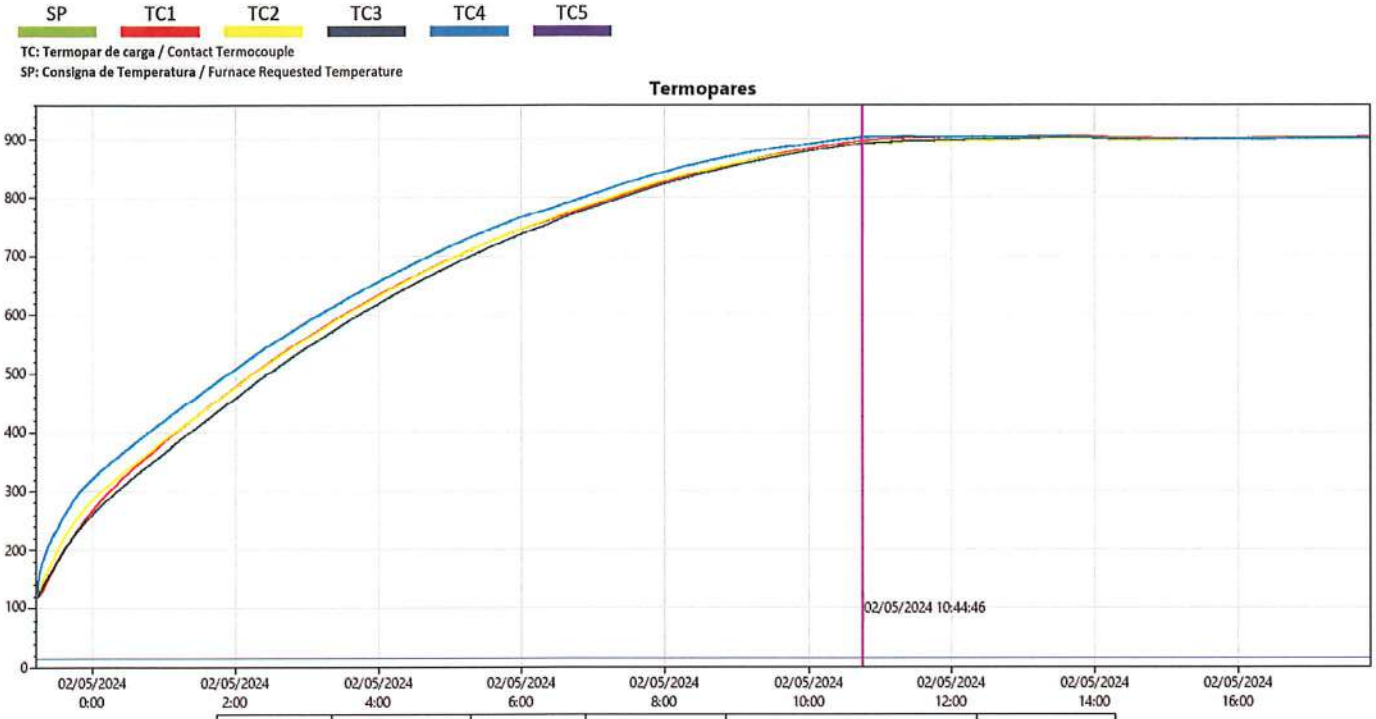
| ESPECIFICACIÓN DE TRATAMIENTO TÉRMICO / SPECIFICATION FOR HEAT TREATMENT | Normalizado según / Normalized according IN_FIR_PT_04/10/24 |
|---|---|

FIHI Forging Industry S.L.

| FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

GRÁFICO DE TRATAMIENTO / TREATMENT CHART




| | | | | | |
|---|---|---|---|---|---|
| REF.TC1 | 94321-12 | REF.TC2 | 94321-24 | REF.TC3 | 94321-1 |
| REF.TC4 | 94321-11 | REF.TC5 | NO APLICA | REF. LASER OPTICO | |

Conformidad de Tratamiento Termico

Conformity of Heat Treatment

Nombre de responsable / Responsible: Jesús Arruti

| OBSERVACIONES | |
|---|---|

FRANCESCO PARISE
ENGIVEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13/05/2024

FIHI Forging Industry S.L.

| GRI Forges Iraeta<br>FIHI FORGING INDUSTRY, S.L. | Certificado de tratamiento térmico<br>Heat treatment certificate |
|---|---|

| Nº CERTIFICADO / CERTIFICATE Nº | H5-0379 |
|---|---|

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M5018400 | (5) | | | | | | |
| | | | | | | M5018780 | (1)* | | | | | | |
| | | | | | | M5018778 | (2)** | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | 1392810** | C/466767 | | | | | | |
| | | | | | | 1395442 | C/482505 | | | | | | |
| | | | | | TC4>>> | 1395443 | C/482505 | | | | | | |
| | | | | | TC3>>> | 1395445 | C/482504 | | | | | | |
| | | | | | | 1395444 | C/482505 | | | | | | |
| | | | | | TC2>>> | 1395446 | C/482504 | | | | | | |
| | | | | | TC1>>> | 1397272* | C/466767 | | | | | | |

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARCHINO
W ☐
R ☑
DATE: 13./05./2024.

FIHI Forging Industry S.L.

FIHI FORGING INDUSTRY, S.L.

Bº Txiriboga, s/n
20740 Zestoa (Gipuzkoa) SPAIN
Tel: +34 943 147645
Fax: +34 943 148059

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |
|---|---|

| | | |
|---|---|---|
| FECHA DE EMISIÓN / DATE OF ISSUE: | | 09/05/2024 |
| CLIENTE | Nombre | FIHI Forging Industry, S.L. |
| | Dirección | Bº Txiriboga, s/n<br>20740 Zestoa (Gipuzkoa) SPAIN<br>Tel: +34 943 147 645 |
| PEDIDO / ORDER | | P24426 |
| FECHA DE RECEPCIÓN / DATE OF RECEIPT | | 08/05/2024 |
| REFERENCIA / REFERENCE | | L-1392810 |
| MATERIAL ENSAYADO / TESTED MATERIAL: | | M5018778<br>C/466767 |

Reviewed & Review
D. Santos Ávila
09 MAY 2024
BUREAU VERITAS

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024





Information is marked as General and belongs to GRI

FIHI FORGING INDUSTRY, S.L.

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GRI Flanges Iraeta

# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |
|---|---|

## CARACTERÍSITCAS MECÁNICAS / MECHANICAL PROPERTIES

| Fecha / Date | Referencia /Reference | Sentido-ubicación/ Direction-location | Ensayo de tracción / Tensile test | | | | |
|---|---|---|---|---|---|---|---|
| | | | Temperatura/ Temperature (ºC) | Diámetro/ Diameter (mm) | $R_{eH}$ / U.Y.S. (MPa) | Rm / T.S. (MPa) | A/ Elongation (%) |
| 09/05/2024 | L-1392810 | Longitudinal | 21 | 10.04 | 357 | 519 | 32.2 |

Ensayo realizado según / Test carried out according to UNE-EN 6892-1:2020 Met. B y/and IN_FIR_LB_01_07

| Fecha/ Date | Referencia/ Reference | Sentido-ubicación/ Direction-location | Ensayo de flexión por choque / Charpy Impact test | | | |
|---|---|---|---|---|---|---|
| | | | | Energía absorbida / Absorbed Energy , $KV_2$ (J) | | |
| | | | Temperatura/ Temperature (ºC) | Probeta / Specimen 1 | Probeta / Specimen 2 | Probeta / Specimen 3 |
| 09/05/2024 | L-1392810 | Longitudinal | -40 | 167 | 139 | 144 |
| | | Transversal (¼ espesor) | -40 | 53 | 64 | 71 |
| | | Transversal (½ espesor) | -40 | 54 | 49 | 47 |

Ensayo realizado según / Test carried out according to UNE-EN ISO 148-1:2017 y/ and IN_FIR_LB_01_06

| Fecha / Date | Referencia / Reference | Ensayo de tracción en sentido del espesor / through thickness tensile test (Z) | | | |
|---|---|---|---|---|---|
| | | Temperatura / Temperature (ºC) | Probeta / Specimen | Diámetro / Diameter (mm) | Estricción / Area reduction (%) |
| 09/05/2024 | L-1392810 | 22 | 1 | 9.95 | 66 |
| | | 22 | 2 | 10.05 | 63 |
| | | 22 | 3 | 9.98 | 63 |

Ensayo realizado según / Test carried out according to UNE-EN ISO 6892-1:2020 Met.B, UNE-EN 10164:2019 y/ and IN_FIR_LB_01_07

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024

BUREAU VERITAS



F_FIR_LB_01_19_01_R2
Fecha rev. Formato: 06/06/2023

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# CERTIFICADO DE ENSAYOS

| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |
|---|---|

## ANALISIS QUÍMICO / CHEMICAL ANALYSIS

| Fecha / Date | Referencia / Reference | Composición / Composition (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | C | Si | Mn | P | S | Cr | Mo |
| 09/05/2024 | L-1392810 | 0.161 | 0.31 | 1.28 | 0.012 | 0.010 | 0.11 | 0.016 |
| | C/466767* | 0.147 | 0.32 | 1.33 | 0.013 | 0.009 | 0.11 | 0.02 |
| **Fecha / Date** | **Referencia / Reference** | **Ni** | **Cu** | **V** | **Al** | **Nb** | **Ti** | **N** |
| 09/05/2024 | L-1392810 | 0.06 | 0.11 | 0.068 | 0.021 | 0.002 | 0.004 | 0.0058 |
| | C/466767* | 0.07 | 0.12 | 0.072 | 0.029 | 0.003 | 0.0048 | 0.0098 |

Ensayo realizado según / Test carried out according to IN_FIR_LB_01_01 y/and IN_FIR_LB_01_04

| Fecha / Date | Referencia / Reference | Parámetros calculados / Calculated parámeters | |
|---|---|---|---|
| | | $C_{EQ}$ (1) ($C_{EQ}$= C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15) (%) | $C_{ET}$ (2) ($C_{ET}$= C + (Mn+Mo)/10 + (Cr+Cu)/20 + Ni/40) (%) |
| 09/05/2024 | L-1392810 | 0.426 | N/A |
| | C/466767* | 0.422 | |

(1) Parámetro calculado según / Calculated parameter according to EN-10025-1:2006

(2) Parámetro calculado según / Calculated parameter according to EN-1011-2:2001

FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☑
R ☑
DATE: 09/05/2024

Witness
09 MAY 2024
BUREAU VERITAS





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# CERTIFICADO DE ENSAYOS

| | |
|---|---|
| INFORME NUMERO/ REPORT NUMBER: | FIHI024426 |

## OBSERVACIONES / COMMENTS

*Datos proporcionados por el proveedor / Data provided by supplier

## FIRMA / SIGNATURE

Witness
09 MAY 2024

FIHI Forging Industry S.L.

Cristina Iparraguirre

Responsable de laboratorio /

Laboratory responsible

FRANCESCO PARISE
ENGIVEX Inspector on behalf of: ROSETTI MARINO
W ☑
R ☑
DATE: 09.05.2024

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GRI Flanges Iraeta

FIHI FORGING INDUSTRY S.L

# INFORME DE INSPECCIÓN POR ULTRASONIDOS Y VISUAL
# ULTRASONIC AND VISUAL INSPECTION REPORT

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Nº de Serie** /Serial Nº: | OF:: | | M: | 2022233 | L: | 1400647 | **Cliente** / Customer: | ROSETTI MARINO S.P.A |
| | | | | | | | **Plano Cliente** / Customer Drawing: | TEST COUPON |
| **Descripción** / Description: | FLANGE | | | | | | | |

| | | | |
|---|---|---|---|
| **Nombre del técnico** / Name of the technician: | URTZI LANDA | **Nivel** / Level: | 2 |
| **Organización de inspección** / Examination organization: | FIHI FORGING INDUSTRY S.L. | **Nº Certificado** / Certificate No.: | E-A-004708-UT-2-MS-2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Identificación del equipo de inspección** / Identification of used equipment: | | | | OLYMPUS - EPOCH | | | |
| **Identificación de bloque de referencia empleado** / Identification of used reference block (s) | | | | | | | |
| **V1-No.:** | 12545 | **V2-No.:** | 50434-20398 | **TIF-Block No.:** | FI-UT-BI | **Other:** | |
| **Verificación de palpadores** / Probe check | ☒ OK | ☐ NO OK | | **Acoplante** / Couplant: | | ACEITE / OIL | |

**Información palpadores utilizados (tipo, nº identificación, frecuencia y ángulo real de salida del palpador** / Information of used probes (type, ID number, frecuency and the probes angle

| Palpador / Probe | Tipo Palpador / Probe type | Nº Identificación / Id. No. | Frec. ángulo / Freq angle | Palpador / Probe | Tipo Palpador / Probe type | Nº Identificación / Id. No. | Frec. ángulo / Freq angle |
|---|---|---|---|---|---|---|---|
| Probe "A" | B4S | 57746 | 4 Mhz / 0 ° | Probe "B" | DL4R | 1370104 | 4 Mhz /0 ° |
| Probe "C" | SWB45-2 | 58414-52386 | 2 Mhz /45° | Probe "D" | SWB70 -2 | 58416-51812 | 2 Mhz / 70 ° |
| Probe "E" | | | | Probe "F" | | | |

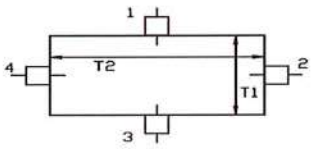
| **Normas a aplicar** / Standards to be apply | | |
|---|---|---|
| **Criterio de aceptación material base** / Base material aceptance criteria | **Criterio de aceptación Soldadura** / Welds aceptance criteria | **Criterio de aceptación inspección visual** / Visual inspections acceptance criteria |
| EN 10308 clase 3 | | |
| | | |
| | | |

**Ganancia empleada para el nivel de referencia y valores usados para la corrección por perdidas por transferencia** / Gain setting for reference level and values used for transfer corrections

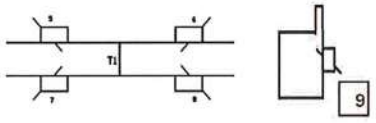
| | A: | B: | C: | D: | E: | F: |
|---|---|---|---|---|---|---|
| **ID Palpador** / Probe ID | | | | | | |
| **Método de ajuste** / Method settings (*) | 3 | 3 | 1 | 1 | | |
| **Campo aplicación** / Setting range | 300 mm | 300 mm | 300 mm | 300 mm | mm | mm |
| **Nivel de referencia** / Setting reference | (dia) 2 mm | (dia) 2 mm | (dia) 3 mm | (dia) 3 mm | (dia) mm | (dia) mm |
| **Ajuste de la base** / Basic set.-ref curve | dB | dB | dB | dB | dB | dB |
| **Corrección perdida transferencia** /Transfer correction | dB | dB | 2 dB | 2 dB | dB | dB |
| **Ganancia adicional para la inspección** / Extra gain for scanning | dB | dB | 14 dB | 14 dB | dB | dB |
| **TOTAL** | dB | dB | dB | dB | dB | dB |

**(*) Método de ajuste de la sensibilidad: 1- taladros laterales 2- Taladros de fondo plano 3- Curvas distancia amplitud (DAC)**
(*) Method for setting of the sensitivity: 1 Side drilled holes 2- Flat bottom holes 3- Distance gain size (DGS)

**Posición para la inspección de defectos longitudinales y laminación** / Scanning position for longitudinal defects and lamination




**Posición para la inspección de soldaduras** / Scanning position for weldings inspection




**Extension del examen** / Extent of examination

| Tipo de insp. / Type of insp. (2) | Espesor 1 / Thickness 1 | Espesor 2 / Thickness 2 | Palpador – Posición palpador / Probe- probe position | Área de inspección/ Inspection area |
|---|---|---|---|---|
| 2 | 100 mm | mm | C5/C6 - C7/C8 - D5/D6 - D7/D8 - C9 / D9 | 100% |
| 3 | 100 mm | 320 mm | A1/A2 - B1/B2 | 100% |
| | mm | mm | | % |
| | mm | mm | | % |

**2) Tipo de inspección: 1: Insp. de aros laminados de sección rectangular 2: Insp. de las soldaduras 3: Insp. de aro fabricado en llanta de sección rectangular**
2) Type of inspection: 1: Insp. of the seamless rolled ring with rectangular cross section 2: Insp. of the weld in the steel bar 3: Insp. of the ring made out of bars with rectangular cross section

**Resultado de la inspección y marcas** / Result of the examination and remarks:
☒ **ACEPTABLE** / ACCEPTABLE
☐ **NO ACEPTABLE** / NOT ACCEPTABLE

**Firma Inspector** / Technician signature: FIHI Forging Industry S.L.

**Fecha** / Date: 12.04.2024

**Responsable de NDT y supervisor** / NDT responsible and supervisor:
Urtzi Landa : E - A - 004708 - UT - 2 - MS - 2

**Firma supervisor** / Supervisor Signature: FIHI Forging Industry S.L.



FRANCESCO PARISE
ENGINEX Inspector on behalf of: ROSSETTI MARINO
W ☐
R ☑
DATE: 13 / 05 / 2024