



Georgsmarienhütte
 GmbH - seit 1856 - Edelstahl

Produktionsnummer
 70289884

Leistungstermin
 19.04.2010

Auftragnummer
 30169890

Produktionsjahr
 10/10

Werkzeugnummer
 778817

EN 10204

Produktionsnummer
 3880
 Zertifikatsnummer
 /2010

Materialnummer
 16CRNIMO7-
 6/ZP1A

Produktionsjahr
 10/10

Werkzeugnummer
 1299-49114

Materialnummer
 E / Vak.

Materialnummer
 31PAINOSUS

Materialnummer
 35,000 MM

Materialnummer
 5,000

Materialnummer
 5.615 KG

Materialnummer
 2,000

Produktionsnummer
 2

Produktionsnummer
 05401/094306

Produktionsnummer
 1.1077803600U

Produktionsnummer
 012016-1

Produktionsnummer
 012016-1

Produktionsnummer
 1.1077803600U

Produktionsnummer
 GN 1023,11/02

Produktionsnummer
 ZP 1 A,11/05

Chem. Zusammensetzung / Chem. Composition / Composition chimique %

C	Si	Mn	P	S	Cu	Sn	Al	Cr	Mo	Ni
0,21	0,27	0,54	0,010	0,023	0,15	0,009	0,028	1,64	0,25	1,45
N	Nb	Ca	Pb	As	Sb	O2	B	V		
0,003	0,0014	0,0030	0,0007	0,0001	0,0077	0,0014	0,0007	0,0003	0,01	

Mechanische Eigenschaften / Mechanical properties / Caracteristiques mecaniques

Temp.	Yield strength	Tensile strength	Elongation	Reduction of area	Impact energy	Charpy transition temperature	Hardness
°C	MPa	MPa	%	%	J	°C	HRC
RT							279 HB

Materialprüfung: 5=43,50 10=42,10 11=41,50 20=37,00 25=36,00

50mm=32,30HRC

100% Flachbiegeprüfung und 100% Rißprüfung wurden durchgeführt.

unvollständiger KI Oxide = 0,00

Flachbiegeprüfung: 5-6

Flachbiegeprüfung: 16,6-fach

Flachbiegeprüfung: 70 kN

Freigegeben

Datum 21.04.10

Name Hellwig

Stempel
 13.04.2010



LSW
Lech-Stahlwerke

LECH-STAHLLWERKE GMBH

86405 MEITINGEN
HERBERTSHOFEN

LKW-Anschrift:
Truck address:
Adresse poids lourd:

Herbertshofen
Industriestraße 1

Telefon: +49 8271 82-0
http://www.lech-stahlwerke.de

Lech-Stahlwerke GmbH * Postfach 1111 * D - 86400 Meitingen

ZEUGNIS NR. CERTIFICATE NO. NO. DE CERTIFICAT		16411 03	Datum Date Date	01.03.16
Kundenbestellung Nr. Customer order No. No. de commande client		505708 ; Mat-Nr.918242		
LSW-Auftragsnr. Works order No. No. de commande		16411-1341	Schmelze Nr. Cast No. No. de Coulee	
LSW-Nummer LSW No. No. de LSW		H0200	592837	

ZERTIFIKAT * CERTIFICATE * CERTIFICAT DIN EN 10204

3.1 ABNAHMEPRÜFZEUGNIS 3.1

Erzeugnisform Product form Forme de produit	I-a Stabstahl	Abmessung Dimension Dimension	R 75,00 mm	Maßtoleranz Dimensional tolerance Tolerance dimensionnelle	+/-0,5mm
Anforderungen Requirements Exigences	.:137168 Ausg.7/08 17.09.08	Gewicht Weight Poids		Gießabmessung Casting dimension Dimension de coulee	240x240 mm
Werkstoff Material Materiau	E*/VD** CC*** ZF7B	Werkstoff Nr. Material No. No. de materiau	1.7168	Umformgrad Deformation degree Taux de corroyage	13,0:1

SCHMELZANALYSE % * HEAT ANALYSIS % * ANALYSE DE COULEE %							
C	0,16	Si	0,28	Mn	1,34	P	0,007
S	0,023	Cr	1,28	Mo	0,05	Ni	0,20
Cu	0,13	Sn	0,008	Al	0,027	V	0,01
B	0,0017	Ti	0,001	Nb	0,002	W	
Co		Sb	0,0015	As	0,005	Te	
Ca	0,0008	N	0,0110	H		Bi	

STIRNABSCHRECKVERSUCH * JOMINY TEST * ESSAI DE JOMINY					Normalisiert bei °C Normalized at Normalise a	Gehärtet bei °C Hardened at Trempe a
mm	5,00	10,00	25,00	50,00		
HRC	42,0	35,4	27,3	22,9		870°
mm						
HRC					Lieferzustand Condition of delivery Etat de livraison	+S

ZUGVERSUCH * TENSILE TEST * ESSAI DE TRACTION							HÄRTEPRÜFUNG / LIEFERZUSTAND
Behandlungs- zustand Treatment cond. Etat de traitement	Probe Nr. Specimen No. No. d'éprouvette	Probestab mm Test bar Eprouvette	Streckgrenze (Re N/mm ²) Yield strength Limite elastique	Zugfestigkeit (Rm N/mm ²) Tensile strength Resistance a la traction	Dehnung % (A5) Elongation Allongement	Brucheinschg. % (Z) Reduct. of area Striction a la rupture	HÄRTEPRÜFUNG / LIEFERZUSTAND HARDNESS TEST / CONDITION OF DELIVERY ESSAI DE DURETE / ETAT DE LIVRAISON
							HB30 212

KERBSCHLAGBIEGEVERSUCH * NOTCHED BAR IMPACT TEST * ESSAI DE RESILIENCE							KORNGRÖSSE GRAIN SIZE GROSSEUR DE GRAIN
Behandlungs- zustand Treatment cond. Etat de traitement	Probe Nr. Specimen No. No. d'éprouvette	Prüftemperatur °C Test temperature Temperature d'essai	Probenform Specimen form Forme d'éprouvette	L Längs * Longitudinal * Longitudinal	Q Quer * Transversal Transversal	Kerbschlagversuch J ; J/cm ² Notch toughness Essai de resilience	ZF 5-8
							REINHEITSGRAD DEGREE OF PURITY DEGRE DE PURETE
							K4=0 F.OXIDE

Bemerkungen /
Kennzeichnung
Remarks /
Ident. marking
Remarques /
Marquage

STRANGGUSS

F_{dyn} = 49-49-50-51-50-49 kN
O=9PPM

Zerstörungsfreie
Prüfungen
Non-Destructive
Tests
Les essais non
destructifs

100% Rissprüfung auf 0,30mm
100% US-Prüfung KSR 2,0mm
100% Verwechslungsprüfung mit Spectrotest am geschl. Bund

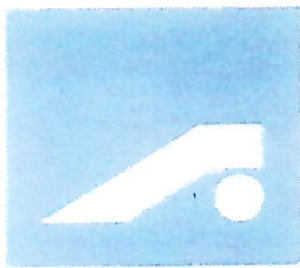
Prüfanforderungen (wenn nichts anderes vereinbart): * Zugversuch DIN EN ISO 6892-1 Methode A24 Stempel des Werksachverständigen * Cachet d'expert
Kerbschlagbiegeversuch DIN EN ISO 148-1 R=2mm * Stirnabschreckversuch DIN EN ISO 642
Reinheitsgradbestimmung DIN 50.602 * Abschreckkorngroße DIN EN ISO 643

* E * Y ** VD *** CC
Elektrolichtbogenofen Sauerstoffblasverfahren Vakuumentgas Stranggußverfahren
Electric arc furnace Oxygen steelmaking process Vacuum degassed Continuous casting
Four a arc électrique Procédé de conversion a l'oxygene Degaze sous vide Coulee continue

Lieferung entspricht der Richtlinie 2000/53/EG v. 18.09.2000, der gültigen GADSL und der DIN 51385 / Material nicht radioaktiv!
Vorsitzender des Aufsichtsrates: Walter Schwimbersky
Geschäftsführung: Dipl.-Ing Knut Rummeler, Mag. Simon Zeilberger, Jochen Henze
Registergericht: Amtsgericht Augsburg, HRB 7129
(DO-05-06-405 Rev. 32 v. 01/2016)

-QS- i.A. H. Schuster





SAH
Stahlwerk Annabütte

323
 Fon: +49 (0) 8654 437-0
 Fax: +49 (0) 8654 437-205
 Mail: stahlwerk@annabuette.de
 Web: www.annabuette.de

Abmessung Order No. Nom. de commande	VR037009-0010	Date Date Date	1.03.16
Fabrikations-Nr. Order number No. No. de la commande client	T062377-1	Schmelz-Nr. Cast No. No. de la coulée	590001
Querschnitt Cross section Dimension de la coulée	178 x 178 mm	Lot No.	L0961

ZERTIFIKAT * CERTIFICATE * CERTIFICAT DIN EN 10204:2004 Abnahmeprüfzeugnis 3.1

Material Material Matériau	Stabstahl	Abmessung Dimension Dimension	R 28,00 mm
Normen Standards Normes	TL 0322-8/16.06.2015 + TL-Sc 7_14/19.11.2014	Maßtoleranz Dimensional tolerance Tolérance dimensionnelle	EN 10209 P
Chemische Zusammensetzung Chemical composition Composition chimique	CC E 20MnCr5+HH	Uniformität Deformation Transformation	51,5

SCHMELZANALYSE % * HEAT ANALYSIS % * ANALYSE DE LA COULÉE %															
C	0,20	Si	0,22	Mn	1,26	P	0,008	S	0,023	Cr	1,16	Mo	0,04	Ni	0,11
Al	0,15	Sn	0,011	Al	0,024	V	0,01	B	0,0004	Ti	0,001	Nb	0,003	W	
As		Sb	0,002	As		Te		Ca		N	0,0080	H	0,00022	Bi	

STIRNABSCHRECKVERSUCH * JOMINY TEST * ESSAI DE JOMINY									
				5,00	10,00	15,00	20,00		
				44,6	38,7	37,4	28,3		

ZUGVERSUCH * TENSILE TEST * ESSAI DE TRACTION							
Bruchdehnung Elongation Allongement	Bruchdehnung Elongation Allongement	Bruchdehnung Elongation Allongement	Bruchdehnung Elongation Allongement	Bruchdehnung Elongation Allongement	Bruchdehnung Elongation Allongement	Bruchdehnung Elongation Allongement	Bruchdehnung Elongation Allongement
271							

KERBSCHLAGBIEGEVERSUCH * NOTCHED BAR IMPACT TEST * ESSAI DE RESILIENCE					
Charpy	Charpy	Charpy	Charpy	Charpy	Charpy
ASTM 7-8					

Material nicht radioaktiv kontaminiert. EN10221/Oberflächengüteklasse D 0:0,00315

Das Zeugnis wurde maschinell erstellt. Für den Inhalt ist der Hersteller verantwortlich. (Formblatt Nr. 04-E-02-01/04-01/05-01)



01

ABNAHMEPRUEFZEUGNIS
 3.1
 NACH EN 10204
 Nr/No 510161 vom/duof 28.11.2017

Besteller / Consignée / Purchaser
 99077/281617/00
 vom/duof 28.11.17

Bestell-Nr. / N° commande / Order No.
 06.10.2017

Werksauftrag
 Commande usine
 Mill's order No.
 4127523

5500000339

Erzeugnisform, Werkstoff, Lieferbedingung / Product, nuance, conditions de fourniture / Product, quality, specifications
 ZF1A
 gemäß Werkstoffdatenblatt
 4 6587 Revision 5 vom
 30.05.2016 und Stellungnahme SAG vom 15.06.2016 und
 Liefervorschrift TL- St vom 19.11.2014 und Stellungnahme SAG
 vom 05.01.2015 Artikel-Code 2000435.
 Stabstahl gewalzt

Pos. Poste Item	Anzahl Nombre Quantity	Abmessung / Dimensions Poids Weight	Schn.-Nr. N° coulé Heat-No	Härte / Dureté / Hardness		Zugversuch / Traction / Tensile Test						Kerbschlagarbeit / Resilience / Impact value					
				HB30	296	°C	°C	R	A	Z	R	M	N	°C	°C	°C	
0100	3	Stab rund 50 7350- 7650	11460551370	296	297												

Schmelzer-Nr. N° coulé Heat-No.	Erschm.- Art/ Mode de fusion Melt.furn.	Chemische Zusammensetzung in % / Composition chimique en % / Chemical composition in % (H + O in ppm)																
		C	SI	MN	P	S	CR	NI	MO	CU	SN	N	AL	NB	TI	CA	O	SB
551370	Y	0.164	0.237	0.725	0.008	0.024	1.640	1.410	0.266	0.010	0.002	0.012	0.036	0.002	0.001	0.001	1.000	0.002

Schmelzer-Nr. N° coulé Heat-No.	Stirnbechversuch / Essai de trempabilité End-quench test	Härte / Dureté / Hardness		HRC		REINHEITSGRAD		
		5,0	10,0	25,0	50,0	DIN	NACH	
551370	43,2	42,6	35,7	32,8			DIN 50602	NACH
							K 4 <	10

Schmelzer-Nr. N° coulé Heat-No.	Korngröße Grossueur du grain Grain size	Härte / Dureté / Hardness	
		Abstand / Distance	[mm]
551370	>= 5		

Besondere Prüfungen und Bemerkungen / Essais particuliers et remarques / Special tests and remarks
 AUS STRANGGUSS GEWALZT 240 X 240
 VERFORMUNGSGRAD : 29,5 FACH
 100 % US-, RISS- UND VERWECHSLUNGSGEPRUEFT
 DAS DELIEFERTE MATERIAL IST FREI VON IONISIERENDER STRAHLUNG, DIE UEBER
 DIE NATUERLICHE UMGEBUNGSSTRAHLUNG HINAUSGEHT.
 KORNGROESSE NACH ZFN 5016 V. 03/214

Die chemischen und technischen Labordaten der Saarstahl AG sind akkreditiert nach DIN EN ISO/IEC 17025
 Les laboratoires de chimie et les laboratoires techniques de Saarstahl AG sont certifiés selon la norme DIN EN ISO/IEC 17025
 The chemical and technical laboratories of the Saarstahl AG are accredited acc. to DIN EN ISO/IEC 17025


Zeichen des Herstellers
 Sigle de l'usine
 Trade Mark
 (SAAR VK)

Zeichen des Sachverständigen
 Poisson de contrôle
 Inspectors stamp
 (Signature)

saarstahl
 Qualitätswesen WWV

ABNAHMEAUFTRAGTER, LEITER QM

Сертификат качества Certificate of quality № 4075
INSPECTION CERTIFICATE EN 10204-3.1

Quality management system has been certified according to ISO 9001:2015 by TUV Thuringen e. V. (Certificate Number TIC 15 100 159230) Quality management system has been certified according to BS EN ISO 9001:2008 by CARES (Great Britain) (Certificate Number 1064) Quality management system has been certified according to IATF 16949:2016 by TUV Rheinland Cert GmbH (Certificate Number 01 111 005043) Environmental management system has been certified according to ISO 14001:2015 by TUV Thuringen e. V. (Certificate Number TIC 15 104 151299) Occupational health and safety management system has been certified according to BS OHSAS 18001:2007 by TUV Thuringen e. V. (Certificate Number TIC 15 116 15624) Energy management system has been certified according to ISO 50001:2011 by TUV Thuringen e.V. (Certificate Number TIC 15 275 18194)	Contract Contract № 18020245-3 От: Date 18.01.2018	Лист Sheet 1 Листов Sheets 1
	Вагон (авт) Car (truck) AM3399-1/A5073E-1	
	Кол-во грузовых мест Quantity of cargo packages 4	
 Продавец (Экспортер) Seller (Exporter) OJSC «BSW – management company of «BMC» holding», 37, Promyshlennaya street, 247210 Zhlobin – Belarus www.belsteel.com	Получатель, Receiver	Страна, Country Germany

№	Описание товара Description of goods	Стандарт Standard	Сост. поставки Condition of Material	Тип упаковки Type of packages
1-2	Hot rolled alloyed round steel with cold-finished	1 5 6757 Ed.18 dd 02.04.2015 + TL-St Ed. 07/14	hot roll-d, material after peeling (+SH)	bundles

№	Номер плашки Heat number	Марка Grade	Код Material code	Диаметр, мм Diameter, mm	Длина, мм Length, mm	Степень обжатия Reduction ratio	Кол-во Quantity	Масса, т Mass, t	
								нетто net	брутто gross
1	374194	VW 4521	1.6757	32	6000	91:1	3	12.760	12.760
2	374194	VW 4521	1.6757	32	4500-6000	91:1	1	0.122	0.122
Всего Total:							4	12.882	12.882

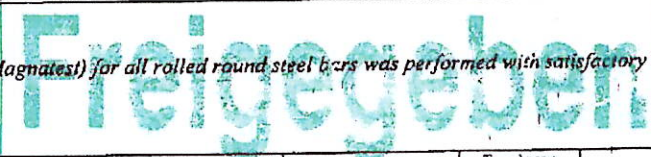
Химический состав Chemical composition, %

№	Heat number	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	V	Al	Ti	As	Sn
1-2	374194	0.22	0.12	0.56	0.008	0.032	0.67	1.59	0.2	0.33	0.004	0.03	0.001	0.009	0.009
	374194	0.0016	0.0016	0.0003	0.0019	0.001		0.011		0.0137	0.01		0.0018	0.64	3

Cu+10*Sn max 0.50%

Remark: * - in rolled product

Контроль идентичности (Магнетест) всех прутков уд. Identify control (Magnatest) for all rolled round steel bars was performed with satisfactory result



Механические свойства Mechanical properties

№	Heat number	Предел прочн. Ultimate strength R _m , МПа	Предел текуч. Yield strength R _e , МПа	Отн. удлинение Relative elongation A, %	Отн. сужение Relative reducing Z, %	Ударная вязкость Impact strength, J	Твердость в состоянии поставки Hardness in delivery conditions	Осадка Upsetting test
1-2	374194					Среднее mean	235	

Прокляиваемость Hardenability acc.to SEP1664

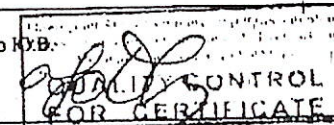
№	Heat number	1.5	3	5	7	9	10	11	13	15	20	25	30	35	40
1-2	374194	HRC		45			38								


Металлография Metallography

№	Heat number	Размер зерна Grain size DIN EN ISO 643	Неметалл. включения Nonmetallic inclusions acc.to										Макро структура Macrostructure	Микро структура Micro structure	Обс Surface decarburization		Полосчатость Banding (segregation)	
			ASTM E45-13												mm	%		
			A		B		C		D		DS							
1-2	374194	9	0	1.5	0.5	0.5	0	0	0	0.5	0.5					0.07	0.21	

Доп. информация Additional information

Application: motor-car construction for HAY Метод производства: сталь электрошлаком, обработка в кипяще, вакуумная дегазация, bloom сечением 250x300, защита от струи, электромагнитное перемешивание Method of manufacturing: EAF, ladle treated, RH vacuum degasser, bloom cast 250x300, shrouded stream, EMS.	Доп. маркировка Add marking: 4500307848 1.6757RD3320SU Order number: T098769-1 Position:0010 Цветная маркировка Colour marking: Размеры и допуски Sizes and tolerances acc. to EN 10278:299 - tolerance class h11 Качество поверхности Quality of surface acc. EN 10277-1, class 3 Шероховатость Roughness Остаточный магнетизм Value of permanent magnetism after Mill shipping УЗК: все прутки проверены, результат уд. ULTRASONIC TEST CONTROL acc to DIN EN 10308 class 4, for all rolled round steel bars was performed with satisfactory result. Недеструктивный контроль: качество поверхности всех прутков проверено, результат уд. NONDESTRUCTIVE TEST of surface quality for all hot rolled round steel bars was performed with satisfactory result.
Радиоактивные компоненты отсутствуют. Материал свободен от ртути. Радиоактивность до 100 Вк/кг. Free of radio-activity contamination. Material is free mercury. The steel does not have radiation more than the natural value and its level is less than 100 Вк/кг.	Контролер ОТК/ Technical Control Inspector: Дмитренко Ю.В. Дата/ Date: 21.07.2018 18:20:32



		Prüfbescheinigung Test certificate Certificat de conformité EN 10204/ 3.1 Seite/Page 1/1		Prüfbescheinigungs-Nr. Certificate-No. No. de certificat 7264/2020								
		Auftrags-Nr. Works-No. No. de l'usine 30252278	Pos-Nr. Item Position 10/ 10	Schmelz-Nr. Heat-No. No. de coulée 250911								
Lieferanzugs-Nr. Shipping note No. No. du bordereau		Lieferdatum Date Du		Werkstoff Quality Qualité C35								
Georgsmarienhütte GmbH - Postfach 1280 - 49110 Georgsmarienhütte		Erhmelzverfahren Melting process Mode d'elaboration E / Vak.		Gießart Casting mode Mode de coulée STRANGGUSS 245 X 245 MM								
Abmess./Dimension/Dimension 36,000 MM		Verformungsgrad reduction ratio taux de déformation 58,8 : 1	Länge Length Longueur 6.000,00 MM + 200,00 MM - 0,00 MM	Gewicht Weight Poids								
Zeichen Hersteller / Abnahmeauftragler Stamps of manufacturer / Inspector Signe d'origine / Expert		Stück / Pieces / Pièces Bund / Bundles / Boîtes 2		Hausruf / Phone / Tél. + 49 5401 39-4609								
Teil-Nr. / Part-No. / Code matière 82000296		Besteller/Customer/Client Bestellnr./Order-No./No.de Commande 4500268881		Verbraucher/User/Destinataire Bestellnr./Order-No./No.de Commande								
Erzform / Product / Produit Stabstahl,rund gewalzt Unbehandelt												
Werkstoffnorm / Standard / Norme DIN 50602,09/85 DIN EN ISO 643,05/13 DIN EN 10221,01/96 SEP 1664,06/04 DIN EN 10083 TEIL 1,10/06 DIN EN 10083 TEIL 2,10/06 DAIMLER AG: DBL 4028.00.02/16 DAIMLER-BENZ:DBL 4032.31,01/02												
Chem.Zusammensetzung / Chem. Composition / Composition chimique												
Element	C %	SI %	MN %	P %	S %	CU %	SN %	AL %	CR %	MO %		
Ist/Act./Réel	0,37	0,26	0,74	0,016	0,026	0,17	0,008	0,030	0,17	0,05		
Element	NI %	N %	H ppm	V %	TI %	B %	NB %	W %	PB %	AS %		
Ist/Act./Réel	0,14	0,010	2,50	0,004	0,0020	0,0003	0,001	0,0040	0,0005	0,007		
Element	SB %	O2 %	CO %									
Ist/Act./Réel	0,001	0,0007	0,0100									
Mechanische Eigenschaften / Mechanical properties / Caractéristiques mécaniques												
Prüben-Nr. Test-No. d'essai	Richtung Direction Sens	Rm / Rp0,2 N/mm²	Rm N/mm²	A %	Z %	Probenform Type of sample Type d'éprouvette	Temp. °C	Kerbschlagarbeit / Impact / Résilience J J J Ø				Härte Hardness Dureté
3928												186 HB
Härbarkeit Jominy / Hardenability Jominy / Trempabilité Jominy												
mm/inch	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10		
Ist/Act./Réel (HRC)	54,30	53,40	48,90	41,60	35,80	31,10	27,20	25,80	25,10	23,90		
mm/inch	J11											
Ist/Act./Réel (HRC)	23,20											
Mikro Reinheitsgrad / Micro cleanliness / Degré de pureté												
Methode	K4_DIN_O											
Ist/Act./Réel	0,00											
Korngröße / Grain size / Grosseur des grains												
Methode	KG_ABSCH											
Ist/Act./Réel	5.0 - 8.0											
100% Identitätsprüfung durchgeführt; 100% US-Prüfung durchgeführt; 100% Rißprüfung durchgeführt AUF RADIOAKTIVITÄT GEPRÜFT												
16.09.2020												
Stelt												
Es wird bestätigt, daß die Lieferung den Vereinbarungen bei der Bestellung entspricht./ We hereby confirm, that the delivery corresponds to the agreement arrived at when picking the order./ Nous certifions que la livraison est conforme de la commande, Lieferdatum, Stückzahl u. Gewicht lt. Lieferanzugs-Date of delivery and quantity as per despatch/Date de livraison et quantité selon bordereau d'expédition												

Freigegeben

Datum 16.09.2020 Name Stelt



**Georgsmarienhütte
GMH GRUPPE**

Prüfbescheinigung Test certificate Certificat de contrôle	EN 10204/ 3.1 Seite/Page 1/1	Prüfbescheinigungs-Nr. Certificate-No. No. de certificat
Auftrags-Nr. Works No. No. de l'usine	Pos. Nr. Item Position	Schmelz-Nr. Heat-No. No. de coulée
30245659	10/ 10	247434
Lieferdatum Date Du	Werkstoff Quality Qualité	Werkstoff-Nr. Standard-No. No. de matière
	16MNCRS5 I	1.7139
Erzeugnisbezeichnung Milling product Mode d'élaboration		Gießart Casting mode Mode de coulée
E / Vak.		STRANGGUSS 245 X 245 MM
Abmaße / Dimension / Dimension	Verformungsgrad reduction ratio taux de déformation	Länge Length Longueur
50,000 MM	30,5 : 1	8.000,00 MM + 200,00 MM
Gewicht Weight Poids	Stück / Pieces / Pièces Bund / Bundles / Boîtes	
Zeichen Hersteller / Abnahmebeauftragter Stamps of manufacturer / Inspector Signe d'origine / Expert		Hersteller / Piece / Piéce + 49 5401 39-4609
2		

Werkstoff / Material / Matière	Besteller/Customs/Client Bestellnr./Order No./No de Commande	Verbraucher/User/Destinataire Bestellnr./Order No./No de Commande
32000197	4500209999	
Erzeugnis / Product / Produit	Unbehandelt	
Erzeugnis / Product / Matière	DIN EN ISO 643,05/13	SEP 1664,06/04
DBL 50802,02/03	DIN EN ISO 683-3,04/19	DAIMLER AG: DBL 4027,00,10/12
SEP 1304,12/06	GETRAG FORD: GCG805004/00,02/10	

Chem. Zusammensetzung / Chem. Composition / Composition chimique

Element	C %	SI %	MN %	P %	S %	CU %	SN %	AL %	CR %	MO %
Erzeugnis / Produit	0,16	0,16	1,20	0,019	0,022	0,17	0,009	0,027	1,04	0,03
Element	NI %	N %	H ppm	TI %	NB %	PB %	AS %	SB %	O2 %	V %
Erzeugnis / Produit	0,12	0,010	1,50	0,0020	0,001	0,0006	0,009	0,001	0,0007	0,006
Element	B %	CA %								
Erzeugnis / Produit	0,0003	0,0002								

Mechanische Eigenschaften / Mechanical properties / Caractéristiques mécaniques

Temp. / Temp.	Erweichungs-temperatur / Yield strength	Bruch-temperatur / Tensile strength	Bruch-temperatur / Impact	Bruch-temperatur / Resilience	Härte / Hardness			
					J	J	J	Ø
20					185 HB			

Härtbarkeit Jominy / Hardenability Jominy / Trempabilité Jominy

Temperatur / Temperature	J1,5	J3	J5	J7	J9	J11	J13	J15	J20	J25
Erzeugnis / Produit (HRC)	43,10	42,30	38,70	33,80	30,90	28,70	26,80	25,80	23,10	21,40

Mikro Reinheitsgrad / Micro cleanliness / Degré de pureté

Methode	K3_EN_10	K3_DIN_0
Erzeugnis / Produit	0,00	0,00

Korngröße / Grain size / Grosseur de grain

Methode	KG_ABSCH
Erzeugnis / Produit	5.0 -8.0

100% Schweißnahtprüfung durchgeführt; 100% US-Prüfung durchgeführt; 100% Rißprüfung durchgeführt.
 Härtebereich: 7 gerechnet gem. SEP 1664, J30, J35 u. J40 eingehalten
 Bruchdehnigkeit geprüft.
 Rißprüfung max. 0,35 mm eingehalten

Steller
20.11.2019

Stella

Abnahmebeauftragter / Inspector / Expert

Freigegeben

Datum: 08.12.19



**Georgsmarienhütte
GMH GRUPPE**

Prüfbescheinigung Test certificate Certificat de contrôle	EN 10204/ 3.1 Seite/Page 1/1	Prüfbescheinigungs-Nr. Certificate No. No. de certificat 9545/2019
Auftrags-Nr. Works No. No. de l'usine 30243299	Pos.-Nr. Item Position / 10	Schmelz-Nr. Heat-No. No. de coulée 246325
Lieferdatum Date Du	Werkstoff Quality Qualité 16MNCRS5	Werkstoff-Nr. Standard-No. No. de matière 1.7139
Erstschmelzprozess Melting process Méthode d'élaboration E / Vak.		Gießart Casting mode Méthode de coulée STRANGGUSS 245 X 245 MM
Abmessung / Dimension / Dimension 50,000 MM	Verformungsgrad reduction ratio taux de déformation 30,5 : 1	Länge Length Longueur 6.000,00 MM + 200,00 MM
Gewicht Weight Poids	Stück / Pieces / Pièces Bund / Bundles / Boîtes	4
Zeichen Hersteller / Abnahmesachverständiger Stamps of manufacturer / Inspector Signe d'origine / Expert		Institut / Essen / Teil + 49 5401 39-4606

Werkzeugnummer / Tool No. 82000196	Kundennummer / Customer / Client Bestellnr. / Order-No. / No. de Commande 4500178379	Verbraucher / User / Destinataire Bestellnr. / Order-No. / No. de Commande
---------------------------------------	---	--

Werkstoffzustand / Material / Matière
Strahltafelrand gewalzt
Unbehandelt

Normen / Standards / Normes
DIN 50692,00/05
DIN 50151,00/05
DIN EN ISO 643,05/13
SEP 1584,12/96
GETRAG FORD:GCG80500-1/00,02/10
SEP 1664,06/04
DAIMLER AG: DBL 4027.00,10/12

Chem. Zusammensetzung / Chem. Composition / Composition chimique

Element	C %	SI %	MN %	P %	S %	CU %	SN %	AL %	CR %	MO %
best./act./réel	0,16	0,18	1,12	0,012	0,026	0,15	0,008	0,029	1,03	0,04
Element	NI %	N %	H ppm	TI %	NB %	PB %	AS %	SB %	O2 %	V %
best./act./réel	0,17	0,011	2,50	0,0010	0,001	0,0009	0,007	0,001	0,0010	0,005
Element	B %	CA %								
best./act./réel	0,0005	0,0002								

Mechanische Eigenschaften / Mechanical properties / Caractéristiques mécaniques

Temp. °C	Probeform Type of sample	Temp. °C	Kerbschlagenergie / Impact / Résistance				Härte Hardness Dureté
			J	J	J	Ø	
590							187 HB

Härtbarkeit Jominy / Hardenability Jominy / Trempabilité Jominy

Abt./inch	J1.5	J3	J5	J7	J9	J11	J13	J15	J20	J25
best./act./réel (HRC)	42,90	41,80	37,70	32,50	29,60	27,60	25,90	24,70	22,20	20,50

Mikro Reinheitsgrad / Micro cleanliness / Degré de pureté

Methode	K4_DIN_O	K3_DIN_O			
best./act./réel	0,00	0,00			

Korngröße / Grain size / Grosseur de grain

Methode	KG_ABSCH			
best./act./réel	5.0 -8.0			

100% Identitätsprüfung durchgeführt; 100% US-Prüfung durchgeführt; 100% Ribprüfung durchgeführt
 100% Identité vérifiée; 100% US certifié; 100% Rib certifié
 100% Identité vérifiée; 100% US certifié; 100% Rib certifié
 100% Identité vérifiée; 100% US certifié; 100% Rib certifié

Datum 30.10.2019 Name Plattner

Plattner
18.10.2019

Wir bestätigen, dass die Lieferung den Vereinbarungen bei der Bestellung entspricht. / We hereby confirm, that the delivery corresponds to the agreement stated at when placing the order. / Nous certifions que la livraison est conforme de la commande. Lieferdatum, Stückzahl u. Preis lt. Lieferbestellung. / Date of delivery and quantity as per dispatch. / Date de livraison et quantité selon bordereau d'expédition.
 Abnahmesachverständiger / Inspector / Expert



Georgsmarienhütte GMH GRUPPE

Prüfbescheinigung Test certificate Certificat de contrôle	EN 10204/ 3.1 Seite/Page 1/1	Prüfbescheinigungs-Nr. Certificate-No. No. de certificat
Auftrags-Nr. Works-No. No. de l'usine	Pos-Nr. Item Position	Schmelz-Nr. Heat-No. No. Coulée
30235976	10/ 10	235654

Lieferanzeigen-Nr. Shipping note No. No. du bordereau	Lieferdatum Date Du	Werkstoff Quality Qualité	Werkstoff Nr. Standard-No. No. de matière
		38MNSIVS5	1.5231

Georgsmarienhütte GmbH - Postfach 1280 - 49110 Georgsmarienhütte		Erschmelzungsart Melting process Mode d'élaboration	Gießart Casting mode Mode de coulée
		E / Vak.	STRANGGUSS 240 X 240 MM
Abmessung Dimension Dimension	80,000 MM	Länge Length Longueur	9.000,00 MM + 150,00 MM - 150,00 MM
Gewicht Weight Poids		Stück / Pieces / Pièces Bund / Bundles / Bottes	
Zeichen Hersteller / Abnahmebeauftragter Stamps of manufacturer / Inspector Signe d'aciérie / Expert		2	Hausruf / Phone / Tél. + 49 5401 39-4609

Teil-Nr. / Part-No. / Code matière	Besteller/Customer/Client Bestellnr./Order-No./No.de Commande	Verbraucher/User/Destataire Bestellnr./Order-No./No.de Commande
916547	506082	

Erzeugnisform / Product / Produit	Unbehandelt
Stabstahl,rund gewalzt	

Werkstoffnorm / Standard / Norme	FL ST 7/14,11/14	WB 1.1.5231/8,08/15
DIN 50602,09/85		


Chem.Zusammensetzung / Chem. Composition / Composition chimique										
Element	C %	SI %	MN %	P %	S %	CU %	SN %	AL %	CR %	MO %
Ist/Act./Réel	0,37	0,68	1,40	0,014	0,026	0,12	0,007	0,023	0,13	0,02
Element	NI %	N %	V %	TI %						
Ist/Act./Réel	0,08	0,014	0,091	0,0060						

Mechanische Eigenschaften / Mechanical properties / Caractéristiques mécaniques												
Proben-Nr. Test-No. No. d'essai	Richtung Direction Sens	ReH / Rp0,2 N/mm²	Rm N/mm²	A %	Z %	Probenform Type of sample Type d'éprouvette	Temp. °C	Kerbschlagarbeit / Impact / Résilience			Härte Hardness Dureté	
3732								J	J	J	Ø	268 HB

Mikro Reinheitsgrad / Micro cleanliness / Degré de pureté						
Methode	K4_DIN_O					
Ist/Act./Réel	0,00					

Korngröße / Grain size / Grosseur de grain					
Methode	KG_ABSCH				
Ist/Act./Réel	6-8				

100% Identitätsprüfung durchgeführt; 100% US-Prüfung durchgeführt;
 100% Rißprüfung durchgeführt
 Auf Radioaktivität geprüft.
 Umformgrad: 11,5-fach
 Härteprobe 30 mm rd:
 Oberflächenhärte:>50HRC eingehalten
 Einhärtetiefe: >4 mm eingehalten

Stelter

 07.2018



STABILIMENTO DI PADOVA, R. FRANCIA

CERTIFICATO DI COLLAUDO - MILL'S TEST CERTIFICATE
CERTIFICAT D'ESSAI - ABNAHMEPRÜFZEUGNIS

EN 10204 3.1

N. 193693

Data 15/04/2014

CLIENTE
CUSTOMER
CLIENT KUNDE

ORDINE CLIENTE - PURCHASE ORDER
COMMANDE LIENT - KUNDEAUFTRAG
6105534

ORDINE - ORDER
COMMANDE - AUFTRAG
F5002377 / 10

ARTICOLO (ACCIAIO) - ITEM (STEEL) - ITEM (ACIER) - ARTIKEL (STAHL)

MARCA ACCIAIO - STEEL GRADE
MARQUE ACIER - STAHLGUTE
ZF7B

COLATA
HEAT-COULEE
SCHMELZE
224948

TONDO LAMINATO RULLATO RICOTTURA DI CESCOIABILITA mm. 110

NORMA - SPECIFICATION - NORME - NORM
ZF7B:2008-07

ACCIAIO DA FORNO ELETTRICO - CONTINUOUS CASTING ELECTRIC STEEL - ACIER ELABORE AU FOUR ELECTRIQUE - ELEKTRO-LICHTBOGENOFEN STAHL

COMPOSIZIONE CHIMICA (%) - CHEMICAL COMPOSITION (%) - COMPOSITION CHIMIQUE (%) - CHEMISCHE ZUSAMMENSETZUNG

C 0.1760 Si 0.2450 Mn 1.2620 P 0.0120 S 0.0280 Cu 0.1990 Cr 1.2450 Ni 0.1600 Sn 0.0090 Al 0.0280 As 0.0050 Mo 0.0750
V 0.0090 Ti 0.0030 B 0.0012 Nb 0.0020 Ca 0.0007 Sb 0.0030

ASTM A255

D.I.

ANALISI GAS
GAS ANALYSIS
ANALYSE GAZ
GAS ANALISE

EN 10002-1

RESILIENZA - IMPACT TEST
RESILIENCE - ZÄHIGKEIT

ZF 15-53

DUREZZA - HARDNESS
DURETE - HÄRTE
EN ISO 6506-1

H2 O2 N2
(ppm) (ppm) (ppm)

Rm
MPa

A
%

Z
%

IMPACT FORCE
(Fdyn) MAX
KN

BRUGGER
SURF
HARDNES
STRENGT

HRC

HB

15 154
%

Rs
MPa

52

60

58,9

1307

156

0.0154

PROD. 110

13 15 20 25 30 35 40 45 50

25.5 25.0

25.0

10

35.5

EN ISO 642

TEMPRABILITA' (JOMINY) - HARDENABILITY (JOMINY TEST) - TREMPABILITE (JOMINY) - HÄRTBARKEIT (TEST JOMINY)

MM 1.5 3 5 7 9 11 13 15 20 25 30 35 40 45 50
 HRC 44.0 43.5 42.5 40.5 37.0 34.0 32.5 31.5 29.5 28.0 27.0 26.5 26.0 25.5 25.0

THE PRODUCT COMPLIES WITH THE REQUIREMENTS OF THE EUROPEAN DIRECTIVE 2000/53/EC RADIOACTIVITY MEETS SPECIFICATION 96/29/EURATOM <= 10.101 Bq/g

BLUMO - BLOOM
BLOOM - VORBLOCK

GRANO
AUSTENITICO
AUSTENITIC GRAIN

INCLUSIONI NON METALLICHE - NON METALLIC INCLUSIONS - INCLUSIONS NON METALLIQUES - NICHTMETALLISCHE EINSCHLÜSSE

DIN 50602 (K)

K 4 (OXIDE) = 5

K (SULFIDE) =

K (TOTAL) =

RIDUZIONE - REDUCTION
REDUCTION - UNFORMUNGSGRAD

6 - 8
EN ISO 643

A (SS) B (OA) C (OS) D (OG)
THIN HEAVY THIN HEAVY THIN HEAVY THIN HEAVY

100% UT CONTROL ACCORDING SEP 1920 CL. 3C, CORE DEFECTS
100% UT CONTROL ACCORDING EN10221 CL. C, SURFACE DEFECTS
100% ANTI-MIX DETECTION
MATERIAL FOR TOTAL HOT FORGING

CONTROLLO QUALITA'
QUALITY CONTROL
CONTROLE QUALITE
QUALITÄTSSTELLE

FORMASTERO IGHILI



Azienda con sistema di gestione per la qualità certificato da IGQ secondo ISO 9001 e ISO/TS 16949

Società assoggettata a direzione e coordinamento da parte di Parsid S.p.A

Stabilimento di:
35127 Camin-Padova
Zona Ind. Sud
Riviera Francia, 9
Tel. 049.828.28.20

Sede legale
35127 Camin-Padova
Zona Ind. Sud
Riviera Francia, 9
Tel. 049.828.28.20

Acciaierie Venete Spa
C.S. € 32.571.000,00 i.v
C.F. e P.IVA 00224180281
R.l. di Padova 00224180281
V.A.T. N° IT 00224180281



OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PART NUMBER 918923	PESO/WEIGHT (KG) 55.943,000	MATERIAL/MATERIAL 705011472	PRODUTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	Cert. N° 0000037106 CORRIDA/HEAT 12091463
CLIENTE/CLIENT		QUALIDADE/GRADE 20CRM05-30	BITOLA/SIZE 80,00 mm	

NORMA/SPECIFICATION

1 1 7264 6 10.01.2017

Nota Fiscal/Invoice	Pedido/Cust.Order	Ord-Fornec/Ord-Supply	Lote/Batch	Peso/Weight (Kg)
0000011865	3214010/1	7563023 - 8116042334	1209146305	1.628,000
0000011862	3214010/1	7563023 - 8116047657	1209146305	2.856,000
0000011858	3214010/1	7563023 - 8116050572	1209146305	25.731,000
0000011891	3214010/1	7563023 - 8116055420	1209146305	25.728,000

ANÁLISE QUÍMICA/CHEMICAL COMPOSITION

C %	Mn %	Si %	P %	S %	Cr %	Ni %	Mo %	V %	Cu %	Sn %	Al %	Ti %	Nb %	N %	B %	Pb %
0,200	1,04	0,15	0,016	0,019	0,94	0,09	0,18	0,0040	0,140	0,0100	0,0270	0,0015	0,0310	0,0110	0,0001	0,0010
H ppm	As %	Sb %	Ni/Cu %	Cu+10Sn %	Al/N											
0,90	0,0030	0,0020	0,6429	0,2400	2,45											

ENSAIOS MECÂNICOS/MECHANICAL PROP

Hardness
HB
221,00

ENSAIOS METALOGRAFÍCOS/METALLOGRAPHIC TESTS

Segregation	Austenitic Grain Size	Tot Dec max	Far Dec max
%	mm	mm	mm
5,000	8	0,00	0,49

MICROINCLUSÕES/INCLUSION RATING NUMBER

DIN
REGULAR K4 - Oxide
0,0

TEMPERABILIDADE/HARDENABILITY

J1.5mm HRC	J3.0mm HRC	J5.0mm HRC	J7.0mm HRC	J11.0mm HRC	J15.0mm HRC	J20.0mm HRC
45,4	45,4	43,3	38,7	33,0	29,3	26,4

GRAU DE REDUÇÃO/REDUCTION RATE

11,5000 : 1



ISO 14001:2004
Certificate Number: 70715



ISO/TS 16949:2009
Certificate Number: 3338



ISO 9001:2008
Certificate Number: 3141

OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

<p>PART NUMBER 918923</p>	<p>PESO/WEIGHT (KG) 55.943,000</p>	<p>MATERIAL/MATERIAL 705011472</p>	<p>QUALIDADE/GRADE 20CRM05-30</p>	<p>BITOLA/SIZE 80,00 mm</p>	<p>Cert. N° 0000037106</p> <p>CORRIDA/HEAT 12091463</p>
<p>CLIENTE/CLIENT</p>		<p>DEPARTAMENTO DA QUALIDADE / QUALITY DEPARTMENT CHARQUEADAS, 18.04.2019</p> <p><i>Rafael Zimmermann</i></p>		<p>RAFAEL ZIMMERMANN STEFANI CREA RS228995</p>	
<p>OBSERVAÇÕES/OBSERVATIONS Meltshop route: EAF, LF, VD, CC. It is forbidden the use of CrVI, Quicksilver, Cadmium, Lead. Material free of radioactive contamination. Material 100% inspected and approved by Aut. Inspection Line. Ultrasound Test ASTM A388. SpectroTest DIN EN 10204/3.1. Material free of mixing. Made in Brazil at Gerdau Charqueadas. Av. Gétulio Vargas, 3200 CEP 96.745-000 Charqueadas/RS. Macroscopic cleanliness according to DBL 4027 fulfilled. 100% US checked acc. SEP 1920, Group 4, Class 4, FBH max. 2 mm. Billet size: 240mm</p>					
<p>ENVIRONMENTAL RECOMMENDATIONS RELATED TO PRODUCTS: In order to contribute with the environment and sustainable development of our productive chain, we recommend to our clients to dispose accordingly the waste related to our products, according to the environmental legislation of your region, state or country.</p>					



ISO 14001:2004
Certificate Number: 7913

ISO/TS 16949:2009
Certificate Number: 3338

ISO 9001:2008
Certificate Number: 3412

OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PRODUTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	Cert. N° 0000037105 CORRIDA/HEAT 12091461
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PART NUMBER 918923	PESO/WEIGHT (KG) 57.983,000	MATERIAL/MATERIAL 705011472	BITOLA/SIZE 80,00 mm
CLIENTE/CLIENT	QUALIDADE/GRADE 20CRM05-30		

NORMA/SPECIFICATION

I 1 7264 6 10.01.2017

Nota Fiscal/Invoice	Pedido/Cust. Order	Ord-Fornec/Ord-Supply	Lote/Batch	Peso/Weight (Kg)
0000011903	3214010/1	7563023 - 8116022694	1209146108	25.820,000
0000011861	3214010/1	7563023 - 8116045713	1209146108	25.831,000
0000011863	3214010/1	7563023 - 8116048767	1209146108	2.870,000
0000011889	3214010/1	7563023 - 8116054647	1209146108	699,000
0000011860	3214010/1	7563023 - 8116055410	1209146108	2.763,000

ANÁLISE QUÍMICA/CHEMICAL COMPOSITION

C	Mn	P	S	Cr	Ni	Mo	V	Cu	Sn	Al	Ti	Nb	N	B	Pb
0,200	1,05	0,019	0,021	0,94	0,08	0,18	0,0040	0,160	0,0100	0,0290	0,0016	0,0280	0,0122	0,0001	0,0010
H	As	Ni/Cu	Cu+10Sn	Al/N											
ppm	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1,20	0,0030	0,0020	0,5000	0,2600	2,38										

ENSAIOS MECÂNICOS/MECHANICAL PROP

Hardness	HB	219,00
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ENSAIOS METALOGRAFICOS/METALLOGRAPHIC TESTS

Segregation	Austenitic	Tot Dec max	Par Dec max
%	mm	mm	mm
5,300	8	0,00	0,52

MICROINCLUSÕES/INCLUSION RATING NUMBER

DIN	K4 - Oxide
REGULAR	0,0

TEMPERABILIDADE/HARDENABILITY


J1.5mm	J3.0mm	J5.0mm	J7.0mm	J11.0mm	J15.0mm	J20.0mm
HRC	HRC	HRC	HRC	HRC	HRC	HRC
45,7	45,2	41,9	36,8	32,5	29,9	26,4

GRAU DE REDUÇÃO/REDUCTION RATE

11,5000 : 1



OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PART NUMBER 918923	PESO/WEIGHT (KG) 57.983,000	MATERIAL/MATERIAL 705011472	PRODUCTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	Cert. N° 0000037105 CORRIDA/HEAT 12091461
CLIENTE/CLIENT		QUALIDADE/GRADE 20CRM05-30	BITOLA/SIZE 80,00 mm	
OBSERVAÇÕES/OBSERVATIONS Meltshop route: EAF, LF, VD, CC. It is forbidden the use of CrVI, Quicksilver, Cadmium, Lead. Material free of radioactive contamination. Material 100% inspected and approved by Aut. Inspection Line. Ultrasound Test ASTM A388. SpectroTest DIN EN 10204/3.1. Material free of mixing. Made in Brazil at Gerdau Charqueadas. Av. Gétulio Vargas, 3200 CEP 96.745-000 Charqueadas/RS. Macroscopic cleanliness according to DBL 4027 fulfilled. 100% US checked acc. SEP 1920, Group 4, Class 4, FBH max. 2 mm. Billet size: 240mm		DEPARTAMENTO DA QUALIDADE / QUALITY DEPARTMENT CHARQUEADAS, 20.04.2019  RAFAEL ZIMMERMANN STEFANI CREA RS228995		
ENVIRONMENTAL RECOMENDATIONS RELATED TO PRODUCTS: In order to contribute with the environment and sustainable development of our productive chain, we recommend to our clients to dispose accordingly the waste related to our products, according to the environmental legislation of your region, state or country.				



ISO 14001:2004
Certificate Number: 3013



ISO 9001:2008
Certificate Number: 3038



ISO 9001:2008
Certificate Number: 3051

OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PART NUMBER 918923	PESO/WEIGHT (KG) 57.035,000	MATERIAL/MATERIAL	PRODUTO/PRODUCT	Cert. N° 0000037104
		705011472	HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	
CLIENTE/CLIENT		QUALIDADE/GRADE	BITOLA/SIZE	
		20CRM05-30	80,00 mm	

NORMA/SPECIFICATION

1.1 7264 6 10.01.2017

Nota Fiscal/Invoice	Pedido/Cust.Order	Ord-Fornec/Ord-Supply	Lote/Batch	Peso/Weight (kg)
0000011838	3214010/1	7563023 - 8116029248	1209145904	11.424,000
0000011834	3214010/1	7563023 - 8116034856	1209145904	2.857,000
0000011830	3214010/1	7563023 - 8116036337	1209145904	14.298,000
0000011835	3214010/1	7563023 - 8116036957	1209145904	25.730,000
0000011831	3214010/1	7563023 - 8116037126	1209145904	2.726,000

ANÁLISE QUÍMICA/CHEMICAL COMPOSITION

C	Mn	Si	P	S	Cr	Ni	Mo	V	Cu	Sn	Al	Ti	Nb	N	B	Pb
0,200	1,06	0,18	0,015	0,020	0,94	0,09	0,19	0,0050	0,140	0,0090	0,0260	0,0020	0,0290	0,0120	0,0001	0,0010
H	As	Sb	Ni/Cu	Cu+10Sn	Al/N											
0,70	0,0020	0,0020	0,6429	0,2300	2,17											

ENSAIOS MECÂNICOS/MECHANICAL PROP

Hardness
HB
208,00

ENSAIOS METALGRÁFICOS/METALLOGRAPHIC TESTS

Segregation	Austenitic Grain Size	Tot Dec max	Par Dec max
%	mm	mm	mm
5,000	7	0,00	0,50

MICROINCLUSÕES/INCLUSION RATING NUMBER

DIN
REGULAR
K4 - Oxide
0,0

TEMPERABILIDADE/HARDENABILITY

J1.5mm HRC	J3.0mm HRC	J5.0mm HRC	J7.0mm HRC	J11.0mm HRC	J15.0mm HRC	J20.0mm HRC
44,7	44,4	41,9	36,7	31,9	29,0	26,4

GRAU DE REDUÇÃO/REDUCTION RATE

11,5000 : 1



CHARQUEADAS

CERTIFICADO DE QUALIDADE
QUALITY CERTIFICATE
CERTIFICADO DE CALIDAD



ISO 14001:2004
Certificate Number: 70713



ISO 16848:2009
Certificate Number: 33318



ISO 9001:2008
Certificate Number: 33433

OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PART NUMBER 918923	PESO/WEIGHT (KG) 57.035,000	MATERIAL/MATERIAL 705011472	PRODUTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	Cert. N° 0000037104
CLIENTE/CLIENT	QUALIDADE/GRADE 20CRM05-30	BITOLA/SIZE 80,00 mm	CORRIDA/HEAT 12091459	

OBSERVAÇÕES/OBSERVATIONS

Meltshop route: EAF, LF, VD, CC.
It is forbidden the use of CrVI, Quicksilver, Cadmium, Lead.
Material free of radioactive contamination.
Material 100% inspected and approved by Aut. Inspection Line.
Ultrasound Test ASTM A388.
SpectroTest DIN EN 10204/3.1.
Material free of mixing.
Made in Brazil at Gerdau Charqueadas.
Av. Gétulio Vargas, 3200 CEP 96.745-000 Charqueadas/RS.
Macroscopic cleanliness according to DBL 4027 fulfilled.
100% US checked acc. SEP 1920, Group 4, Class 4, FBH max. 2 mm.
Billet size: 240mm

DEPARTAMENTO DA QUALIDADE / QUALITY DEPARTMENT
CHARQUEADAS. 17.04.2019

Rafael Zimmermann

RAFAEL ZIMMERMANN STEFANI CREA RS228995

ENVIRONMENTAL RECOMMENDATIONS RELATED TO PRODUCTS:

In order to contribute with the environment and sustainable development of our productive chain, we recommend to our clients to dispose accordingly the waste related to our products, according to the environmental legislation of your region, state or country.



ISO 9001:2008
Certificat. Number: 3045

ISO/TS 16949:2009
Certificat. Number: 3385

ISO 14001:2004
Certificat. Number: 7073

OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PRODUTO/PRODUCT HOT ROLLED ROUND BAR	Cert. N° 0000037103
NO HEAT TREATMENT STRAIGHTENED	
CORRIDA/HEAT 12091457	

PART NUMBER 918923	PESO/WEIGHT (KG) 57.693,000	MATERIAL/MATERIAL 705011472
CLIENTE/CLIENT	QUALIDADE/GRADE 20CRM05-30	BITOLA/SIZE 80,00 mm

NORMA/SPECIFICATION		Peso/Weight (Kg)	
1 1 7264 6 10.01.2017			
Nota Fiscal/Invoice	Pedido/Cust. Order	Ord-Fornec/Ord-Supply	Lote/Batch
0000011892	3214010/1	7563023 - 8116042389	1209145708
0000011857	3214010/1	7563023 - 8116043548	1209145708
0000011890	3214010/1	7563023 - 8116050571	1209145708
0000011859	3214010/1	7563023 - 8116050882	1209145708
0000011868	3214010/1	7563023 - 8116054752	1209145708

ANÁLISE QUÍMICA/CHEMICAL COMPOSITION														
C	%	0,200	Mn	%	1,05	P	%	0,015	S	%	0,020	Cr	%	0,93
H	%	0,0030	As	%	0,0030	Ni	%	0,13	Mo	%	0,18	V	%	0,0040
ppm		1,00	Sb	%	0,0020	Ni/Cu			Cu+10Sn	%		Cu	%	0,200
Hardness		HB		231,00		AL/N								

ENSAIOS MECÂNICOS/MECHANICAL PROP													
Hardness													
HB													
231,00													
ENSAIOS METALGRÁFICOS/METALLOGRAPHIC TESTS													
Segregation		Austenitic		Tot Dec max		Par Dec max							
%		mm		mm		mm							
5,300		8		0,00		0,56							

MICROINCLUSÕES/INCLUSION RATING NUMBER													
DIN													
REGULAR													
K4 - Oxide													
0,0													

TEMPERABILIDADE/HARDENABILITY													
J1.5mm		J3.0mm		J5.0mm		J7.0mm		J11.0mm		J15.0mm		J20.0mm	
HRC		HRC		HRC		HRC		HRC		HRC		HRC	
44,7		45,0		42,8		38,0		32,7		30,0		26,8	

GRAU DE REDUÇÃO/REDUCTION RATE													
11,5000 : 1													



ISO 9001:2008
Certificate Number: 3043



ISO/TS 16949:2009
Certificate Number: 3033



ISO 14001:2004
Certificate Number: 7013

OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PRODUTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	Cert. N° 0000037103
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MATERIAL/MATERIAL 705011472	BITOLA/SIZE 80,00 mm
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PESO/WEIGHT (KG) 57.693,000	QUALIDADE/GRADE 20CRM05-30
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<p>PART NUMBER 918923</p> <p>CLIENTE/CLIENT</p> <p>OBSERVAÇÕES/OBSERVATIONS Meltshop route: EAF, LF, VD, CC. It is forbidden the use of CrVI, Quicksilver, Cadmium, Lead. Material free of radioactive contamination. Material 100% inspected and approved by Aut. Inspection Line. Ultrasound Test ASTM A388. Spectrotest DIN EN 10204/3.1. Material free of mixing. Made in Brazil at Gerdau Charqueadas. Av. Gétulio Vargas, 3200 CEP 96.745-000 Charqueadas/RS. Macroscopic cleanliness according to DBL 4027 fulfilled. 100% US checked acc. SEP 1920, Group 4, Class 4, FBH max. 2 mm. Billet size: 240mm</p> <p>ENVIRONMENTAL RECOMENDATIONS RELATED TO PRODUTCS: In order to contribute with the environment and sustainable development of our productive chain, we recommend to our clients to dispose accordingly the waste related to our products, according to the environmental legislation of your region, state or country.</p>	<p>DEPARTAMENTO DA QUALIDADE / QUALITY DEPARTMENT CHARQUEADAS. 19.04.2019</p> <p><i>Rafael Zimmermann</i></p> <p>RAFAEL ZIMMERMANN STEFANI CREA RS228995</p>
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ISO 14001:2004
Certificate Number: 79713



ISO/TS 16949:2009
Certificate Number: 38388



ISO 9001:2008
Certificate Number: 30142

OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001

PART NUMBER 918923	PESO/WEIGHT (KG) 56.929,000	MATERIAL/MATERIAL 705011472	PRODUTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	Cert. N° 0000037157 CORRIDA/HEAT 12091456
CLIENTE/CLIENT		QUALIDADE/GRADE 20CRM05-30	BITOLA/SIZE 80,00 mm	

NORME/SPECIFICATION

1.1 7264 6 10.01.2017

Nota Fiscal/Invoice	Pedido/Cust. Order	Ord-Fornec/Ord-Supply	Lote/Batch	Peso/Weight (Kg)
0000012128	3214010/1	7563023 - 8116092293	1209145605	1.997,000
0000012109	3214010/1	7563023 - 8116136797	1209145605	2.681,000
0000012160	3214010/1	7563023 - 8116137271	1209145605	716,000
0000012112	3214010/1	7563023 - 8116138748	1209145605	25.759,000
0000012177	3214010/1	7563023 - 8116140470	1209145605	25.776,000

ANÁLISE QUÍMICA/CHEMICAL COMPOSITION

C	Mn	Si	P	S	Cr	Ni	Mo	V	Cu	Sn	Al	Ti	Nb	N	B	Pb
0,200	1,06	0,17	0,018	0,019	0,93	0,12	0,19	0,0050	0,180	0,0110	0,0300	0,0019	0,0310	0,0122	0,0001	0,0010
H	As	Sb	Ni/Cu	Cu+10Sn	Al/N											
ppm	%	%	%	%												
1,30	0,0030	0,0020	0,6667	0,2900	2,46											

ENSAIOS MECÂNICOS/MECHANICAL PROP

Hardness
HB
230,00

ENSAIOS METALOGRAFICOS/METALLOGRAPHIC TESTS

Segregation
Austenitic Grain Size
Tot Dec max Par Dec max
mm mm
0,000 8 0,00 0,54

MICROINCLUSÕES/INCLUSION RATING NUMBER

DIN
REGULAR
K4 - Oxide
0,0

TEMPERABILIDADE/HARDENABILITY

J1.5mm HRC 45,7
J3.0mm HRC 45,2
J5.0mm HRC 41,9
J7.0mm HRC 36,8
J11.0mm HRC 29,9
J15.0mm HRC 26,4
J20.0mm HRC 26,4

GRAU DE REDUÇÃO/REDUCTION RATE

11,5000 : 1



GERDAU CHARQUEADAS



ISO 9001:2008
Certificate Number: 0443



ISO/TS 16949:2009
Certificate Number: 5138



ISO 14001:2004
Certificate Number: 7013

CERTIFICADO DE QUALIDADE
QUALITY CERTIFICATE
CERTIFICADO DE CALIDAD

PRODUTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT STRAIGHTENED	Cert. N° 0000037157
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OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001 / TS16949 / ISO14001	
MATERIAL/MATERIAL 705011.472	

PART NUMBER 918923	PESO/WEIGHT (KG) 56.929,000
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CLIENTE/CLIENT	QUALIDADE/GRADE 20CRM05-30	BITOLA/SIZE 80,00 mm
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<p>OBSERVAÇÕES/OBSERVATIONS</p> <p>Meltshop route: EAF, LF, VD, CC. It is forbidden the use of CrVI, Quicksilver, Cadmium, Lead. Material free of radioactive contamination. Material 100% inspected and approved by Aut. Inspection Line. Ultrasound Test ASTM A388. SpectroTest DIN EN 10204/3.1. Material free of mixing. Made in Brazil at Gerdau Charqueadas. Av. Gétulio Vargas, 3200 CEP 96.745-000 Charqueadas/RS. Macroscopic cleanliness according to DBL 4027 fulfilled. 100% US checked acc. SEP 1920, Group 4, Class 4, FBH max. 2 mm. Billet size: 240mm</p>	<p>DEPARTAMENTO DA QUALIDADE / QUALITY DEPARTMENT CHARQUEADAS, 26.04.2019</p> <p><i>Rafael Zimmermann</i></p> <p>RAFAEL ZIMMERMANN STEFANI CREA RS2228995</p>
<p>ENVIRONMENTAL RECOMMENDATIONS RELATED TO PRODUCTS:</p> <p>In order to contribute with the environment and sustainable development of our productive chain, we recommend to our clients to dispose accordingly the waste related to our products, according to the environmental legislation of your region, state or country.</p>	

INSPECTION CERTIFICATE 3.1

ACCORDING TO EN 10204

ISO 9001 and ISO/TS 16949 approved,
certified by Lloyd's Register LRQA

Delivery address Intended for	Date 170320 Our order 1710248	Cert number B5450793 Pos 1	Ver 1	Page 1																																																																												
Specification B10000 ED.24 AND B10003/100CRMN6/EWI-CP-24 REV.4 + MBT 10-09.SPEC.1 4 3520 REV.5 MBT 39-16, CWI-MS-02 Rev 0 DATED 61713 Product HOT ROLLED BARS	Your order 5500000222	Your art.number 2000108	Ovako grade 837R	Grade 100CRMN6/																																																																												
Check of radioactivity has been performed.																																																																																
Extent of delivery																																																																																
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Quantity kg</td> <td style="width: 20%;">Net weight Kg</td> <td style="width: 20%;">MO number</td> <td style="width: 20%;">Heat Number</td> <td colspan="2"></td> </tr> <tr> <td>24808,0</td> <td>24808,0</td> <td>7310347</td> <td>G5873</td> <td colspan="2"></td> </tr> <tr> <td>OD mm</td> <td colspan="4"></td> </tr> <tr> <td>27,00</td> <td colspan="4"></td> </tr> </table> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Heat number</td> <td colspan="5">Chemical composition</td> </tr> <tr> <td>G5873</td> <td>C %</td> <td>Si %</td> <td>Mn %</td> <td>P %</td> <td>S %</td> </tr> <tr> <td></td> <td>0,94</td> <td>0,57</td> <td>1,03</td> <td>0,012</td> <td>0,004</td> </tr> <tr> <td></td> <td>Cr %</td> <td>Ni %</td> <td>Mo %</td> <td>Cu %</td> <td>V %</td> </tr> <tr> <td></td> <td>1,45</td> <td>0,14</td> <td>0,05</td> <td>0,166</td> <td>0,009</td> </tr> <tr> <td></td> <td>Al %</td> <td>As %</td> <td>Sn %</td> <td>Ti ppm</td> <td>O ppm</td> </tr> <tr> <td></td> <td>0,024</td> <td>0,007</td> <td>0,021</td> <td>16</td> <td>4,5</td> </tr> <tr> <td></td> <td>Ca ppm</td> <td>H ppm</td> <td>Co-60 Bq/g</td> <td colspan="2"></td> </tr> <tr> <td></td> <td>2</td> <td>1,17</td> <td><0,02</td> <td colspan="2"></td> </tr> </table>					Quantity kg	Net weight Kg	MO number	Heat Number			24808,0	24808,0	7310347	G5873			OD mm					27,00					Heat number	Chemical composition					G5873	C %	Si %	Mn %	P %	S %		0,94	0,57	1,03	0,012	0,004		Cr %	Ni %	Mo %	Cu %	V %		1,45	0,14	0,05	0,166	0,009		Al %	As %	Sn %	Ti ppm	O ppm		0,024	0,007	0,021	16	4,5		Ca ppm	H ppm	Co-60 Bq/g				2	1,17	<0,02		
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<i>Continue...</i>																																																																																
Printed by computer		The requirements stipulated are satisfied		Issuer of certificate Johan Karlsson																																																																												

INSPECTION CERTIFICATE 3.1

ACCORDING TO EN 10204

ISO 9001 and ISO/TS 16949 approved,
certified by Lloyd's Register LRQA

Date 170320	Cert number B5450793	Heat number G5873	Ver 1	Page 2				
<p>MICRO INCLUSION ACCORDING TO ASTM A295-14, ASTM E45-13, METHOD A. 2/3 OF ALL SAMPLES AND AT LEAST ONE SAMPLE PER INGOT FULFILLS THE DEMANDS.</p>								
Sample								
	AH	AT	BH	BT	CH	CT	DH	DT
1	0,7	1,2	0,1	0,2	0,0	0,0	0,1	0,0
<p>MICRO STRUCTURE ACC TO SEP 1520</p>								
Sample								
	CN5	CZ6	CZ7					
1	5,0	6,0	7,0					
<p>MACRO-AND MICROINCLUSION RATINGS CHECKED ACCORDING TO THE INSPECTION PLAN OF THE SKF-QA-AGREEMENT. EACH BAR CHECKED FOR CORRECT MATERIAL GRADE. MEETS ALL REQUIREMENTS IN VALID SPEC AND APPROVED DEVIATIONS WE CONFIRM THAT ALL DELIVERED STEEL IS NOT CONTERMINATED BY RADIOACTIVE SUBSTANCES. THE VALUES WILL NOT EXCEED 100BQ/KG. DIAM>=50 MM 100 % ULTRASONIC TESTED ACC.TO ASTM E2375 (CLASS A) WITH 2 MM FBH AS CRITERIA. INGOT CASTING. OVAHEL01</p>								
Printed by computer		The requirements stipulated are satisfied		Issuer of certificate Johan Karlsson				



SeAH Besteel
522, Oehang-ro, Gunsan-si,
Jeollabuk-do, Korea (573-711)

MATERIAL CERTIFICATE

TEL : +82-(0)63-460-8573(Rqpres.)
+82-(0)63-460-8285(QA)
+82-(0)63-460-8470(Technology Service)
FAX : +82-(0)63-460-8423

Size (mm) : 32
Length (mm) : 5,800
Weight (kg) : 6,930
Quantity (pcs) : 189

Specification :
Steel Grade : SCR420H
Shape of Product : Round Bar
Delivery Condition : As Rolled, As Peeled
Melting Process : EAF-LF-VD(RH)-CC

Date : 2020-07-20
Cert. No. : 202007-006680
Customer : S
Heat No. : D07842
Serial-No. :



Inspection Items	Chemical Composition (wt. %)										
	C	Si	Mn	P	S	Cu	Ni	Cr			
Spec.	Min. 17	15	55	30	30	30	25	85			
	Max. 23	35	95	30	30	30	25	125			
Ladle Result	21	26	85	15	12	9	5	116			

Inspection Items	Hardenability (End Quenching Method) HRC, mm, JIS G 0561										
	HRC										
Spec.	Min. 46	45	39	34	31	29	28	27	24	21	18
	Max. 46	45	39	34	31	29	28	27	24	21	18
Result											

Inspection Items	Austenite Grain Size		Product Hardness (HB)		Inspection Items	Reduction Ratio
	Min.	Max.	MID	Result		
Spec.	6		250		Spec.	6
	Max. 8.0		170		Max.	35.7
Result					Result	

Inspection Items	Surface Inspection (mm)		Inspection Items	Ultrasonic Test
	Min.	Max.		
Spec.			Spec.	
			Max.	
Result	GOOD		Result	GOOD

<<Remarks>> * Melting and Casting Process : EAF-LF-VD-CC BILLET(180X180mm), EMS
 * Hardenability : Acc. to JIS G 0561
 * Austenite Grain Size : Acc. to JIS G 0551
 * 100% UT Test : max. 1.2mm FBH
 * 100% crack test : defect depth max. 0.10mm
 * 20% test of mixed-up material in the finished bundle
 * Free of radioactive contamination
 * Specification Review Report : approved date 25-Mar-2020
 * MADE IN KOREA * P.O.# : E211850

Freigegeben

Datum 24.09.2020 Name: M. S. Park

We hereby certify that the material described herein has been made in accordance with the rules of the contract.
 Our quality system is certified in accordance with IATF 16949:2016 / ISO 9001:2015 by KSA

Certified by **S.T. Park**
 Manager of Quality Assurance Dept.