VILLARES METALS

a voestalpine company

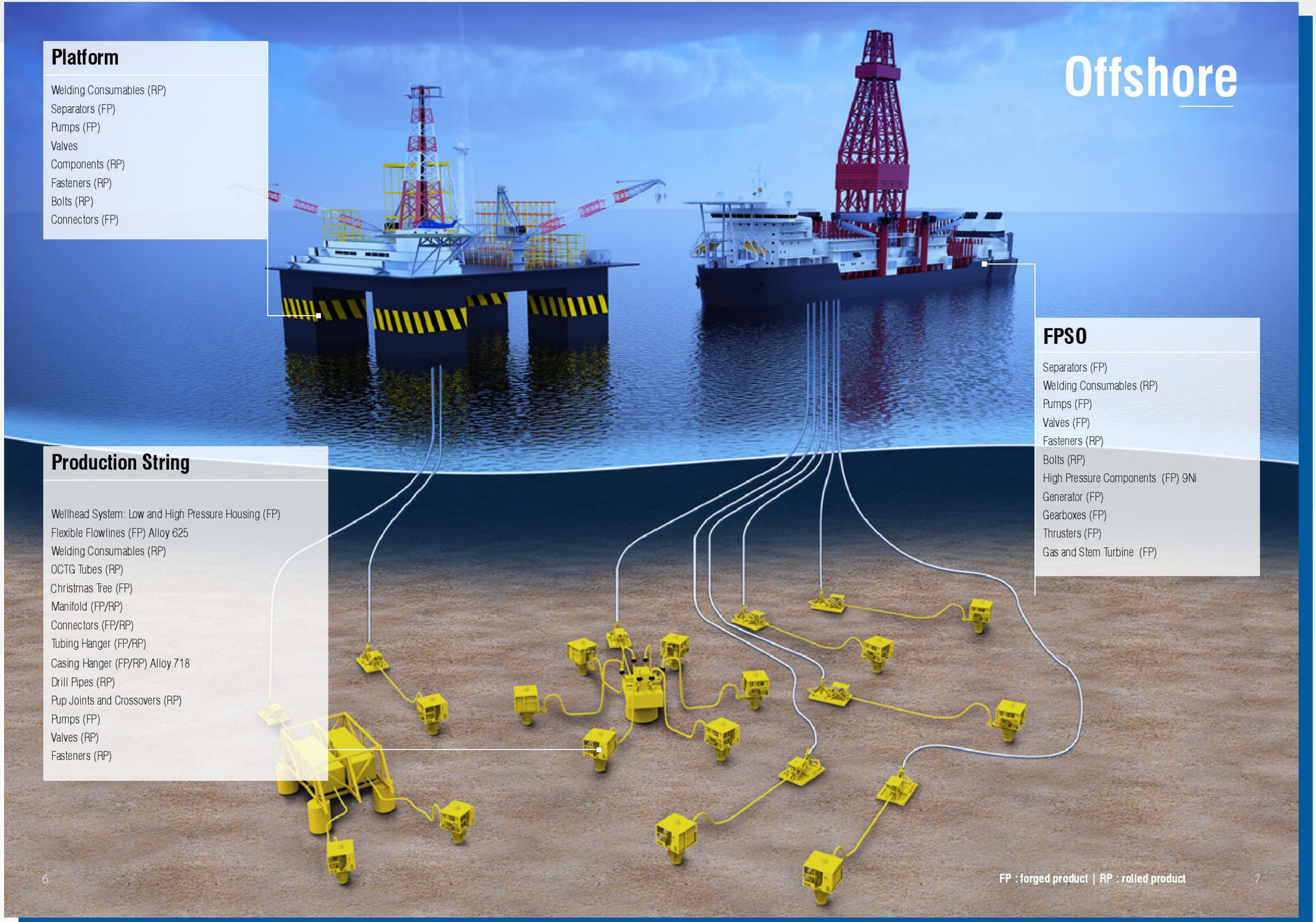
Oil & Gas and CPI

ABOUT VILLARES METALS

Villares Metals is a company of solutions in long products of high alloy special steels and it is part of the High Performance Metals Division of the voestalpine Group, based in Linz (Austria), since 2007. Our special steels and specialty alloys can be provided in several shapes of products or components, those are used for special applications which require excellent properties. We supply the major industry segments: oil & gas, CPI, automotive, tooling, energy and machine building - in Brazil and worldwide. The Villares Metals' differential is its technical expertise, flexibility and capacity to develop special solutions driven to the customer needs.

Materials for oil and gas exploration and production must meet challenging requirements. Villares Metals provides solutions in the form of engineering steels, stainless steels (including duplex and super duplex grades) and specialty alloys for both land and offshore applications. We produce a full spectrum of standard and custom grades in rolled or forged products.

MAIN APPLICATIONS



Offshore

Platform

Welding Consumables (RP)
Separators (FP)
Pumps (FP)
Valves
Components (RP)
Fasteners (RP)
Bolts (RP)
Connectors (FP)

Production String

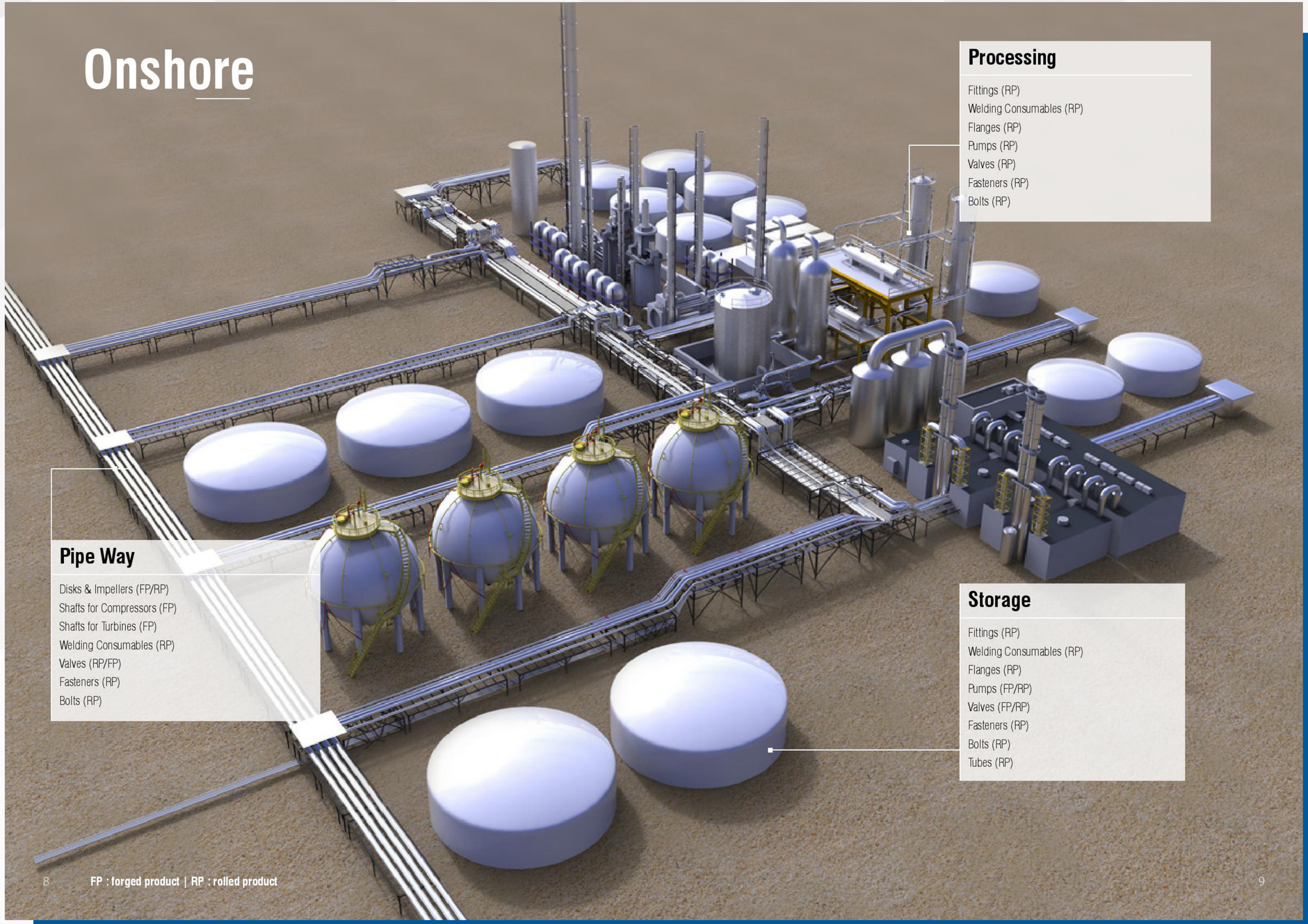
Wellhead System: Low and High Pressure Housing (FP)
Flexible Flowlines (FP) Alloy 625
Welding Consumables (RP)
OCTG Tubes (RP)
Christmas Tree (FP)
Manifold (FP/RP)
Connectors (FP/RP)
Tubing Hanger (FP/RP)
Casing Hanger (FP/RP) Alloy 718
Drill Pipes (RP)
Pup Joints and Crossovers (RP)
Pumps (FP)
Valves (RP)
Fasteners (RP)

FPSO

Separators (FP)
Welding Consumables (RP)
Pumps (FP)
Valves (FP)
Fasteners (RP)
Bolts (RP)
High Pressure Components (FP) 9Ni
Generator (FP)
Gearboxes (FP)
Thrusters (FP)
Gas and Stem Turbine (FP)

FP : forged product | RP : rolled product

MAIN APPLICATIONS



FP : forged product | RP : rolled product

Engineering Steel

	SIMILAR STANDARDS			
	ASTM	**UNSA**	**ISI**	Others
VM40*	ASMT A332 (4340)	G43400	4340	SAE 4340 / AMS 6414
F11	ASTM A182 GRADE F11 (MOD.)	K11597 K11572	-	ASME SA387 Gr. 11
F22	ASTM A182 GRADE F22 (MOD.)	K21590	-	ASME SA387 Gr. 22
VB30	ASTM A322 (8630) ASTM A29 (8630)	G86300	8630	SAE 8630
VL30	ASTM A322 (4130)	G41300	4130	SAE 4130
VL40*	ASTM A322 (4140) ASTM A646(4140)	G41400	4140	AMS 6349
VM30*	ASTM A322 (4330) ASTM A29	K23080	4330	EN 30B / AMS 6411

* Also supplied in remelted condition

Specialty Alloys

	SIMILAR STANDARDS		
	ASTM	**UNSD**	**IN / Wnr.**
VRC625	ASTM B446	UNS N06625	DIN 17744 Wnr. 2.4856
VATX750	ASTM B637	N07750	Wnr. 2.4669
VAT286A	ASTM A660		Wnr. 1.4980
VAT718A	ASTM B637	N07718	Wnr. 2.4668
VAT800HT	ASTM B408	N08811	Wnr. 1.4876 1.4959
VRC400	ASTM B164 B564	N04400W	nr. 2.4360

Precipitation Hardening Steels

	SIMILAR STANDARDS		
	ASTM	**DIN Wnr.**	Others
V630	ASTM - A564 (630) 17-4 PH	1.4542	AMS 5643 AMS 5622
N4534	ASTM - A564 (XM-13) PH 13-8 Mo	1.4534	AMS 5629

Duplex and Super Duplex Stainless Steels

	SIMILAR STANDARDS		
	ASTM	**UNS**	**Wnr. / DIN**
N4460	ASTM A 182 Gr F50 / ASTM A276	UNS S32900	Wnr. 1.4460 DIN X3CrNiMoNbN
N4462*	ASTM A 182 Gr F51 / ASTM A276	UNS S31803	Wnr. 1.4462 DIN 2CrNiMoN
VF53 **	ASTM A 182 Gr F53 / ASTM A276	UNS S32750	Wnr. 1.4410 DIN X2CrNiMoN25-7-4
N4501 **	ASTM A 182 Gr F55 / ASTM A276	UNS S32760	Wnr. 1.4501 DIN 2CrNiMoCuWN25-7-4
N4507 **	ASTM A 182 Gr F61 / ASTM A276	UNS S32550	Wnr. 1.4507 DIN X2CrNiMoCuN25-6-3

*NORSOK MDS D47 **NORSOK MDS D57

- Villares Metals' product line meets the API 6A standards.
- Dimensions and special requirements upon consultation.

Martensitic Stainless Steels

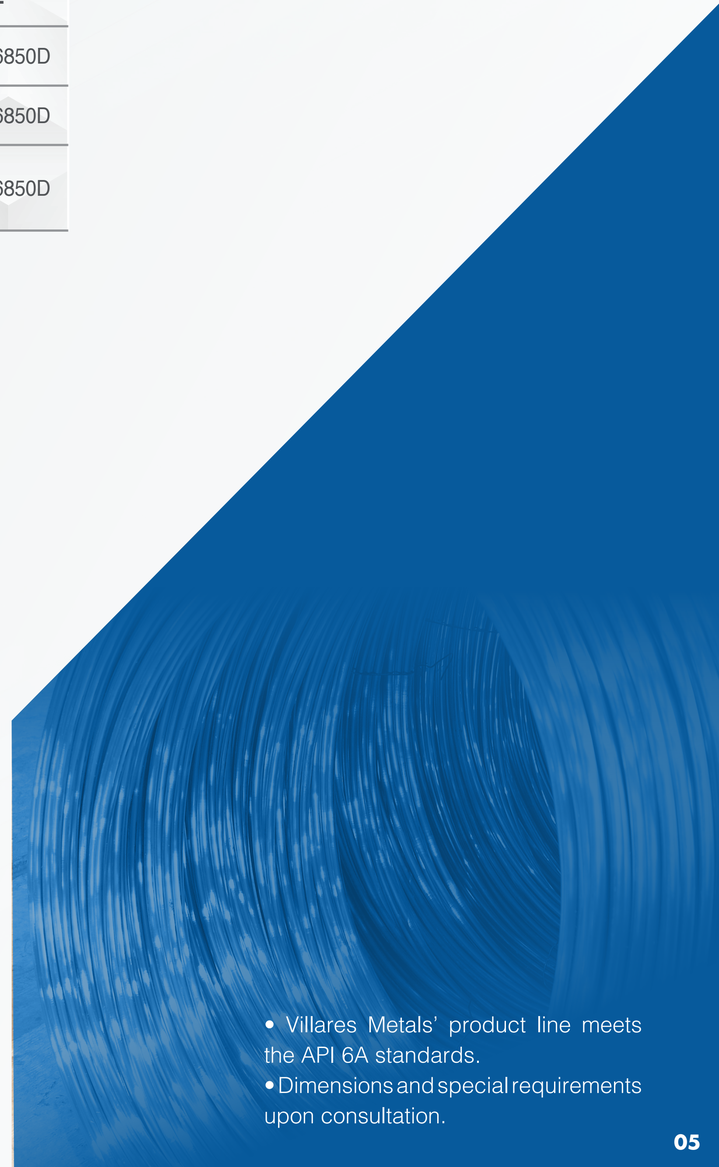
	SIMILAR STANDARDS				
	ASTMU	**NS**	**AISI**	**DIN / Wnr.**	Others
N4313	ASMT A182 Gr F6NM	S41500	-	Wnr. 1.4313 DIN X3CrNiMo13-4	-
VC140	ASTM A276 (410) ASTM A182/ Gr F6a	S41000	410	Wnr. 1.4006 DIN X12Cr13	NBR 5601 SAE 51410
VC150	ASTM A276 (420)	S42000	420	Wnr. 1.4021 DIN X20Cr13	NBR 5601 Type 420
V416	ASTM A582 (416)	S41600	416	Wnr. 1.4005 DIN X12CrS13	NBR 5601 AMS 5610L Type II

Maraging Steels

	SIMILAR STANDARDS			
	ASTMU	**NS**	**AMSM**	**IL**
VART250 (MARAGING 250)	ASTM A579 GR. 72	UNS K92890	AMS 6512	MIL-S-46850D
VART300 (MARAGING 300)	ASTM A579 GR. 73	UNS K93120	AMS 6514	MIL-S-46850D
VXM19	ASTM A276/ ASTM A479 Gr XM19	S20910	AMS 6514	MIL-S-46850D

Austenitic Stainless Steels

	SIMILAR STANDARDS			
	ASTM	**UNS**	**AISI**	**DIN / Wnr.**
V304UF	ASTM A182 / Gr F304 ASTM A276	S304003	04	Wnr. 1.4301 DIN X5CrNi18-10
V304XLUF	ASTM A182 / Gr F304L ASTM A276	S30403	304L	Wnr. 1.4307 DIN X2CrNi18-9
V316UF	ASTM A182 / Gr F316 ASTM A276	S316003	16	Wnr. 1.4401 DIN X5CrNiMo17-12-2
V316XLUF	ASTM A182 / Gr F316L ASTM A276	S31600	316L	Wnr. 1.4404 DIN X2CrNiMo17-12-2
V317L	ASTM A182 / Gr F317L ASTM A276	S31703	317L	Wnr. 1.4449 DIN X3CrNiMo18-12-3
V321	ASTM A182 / Gr F321 ASTM A276	S321003	21	Wnr. 1.4541 DIN X6CrNiTi18-10
V347SI	ASTM A182 / Gr F347 ASTM A276	S347003	47	Wnr. 1.4543 DIN X6CrNiTi18-10



- Villares Metals' product line meets the API 6A standards.
- Dimensions and special requirements upon consultation.

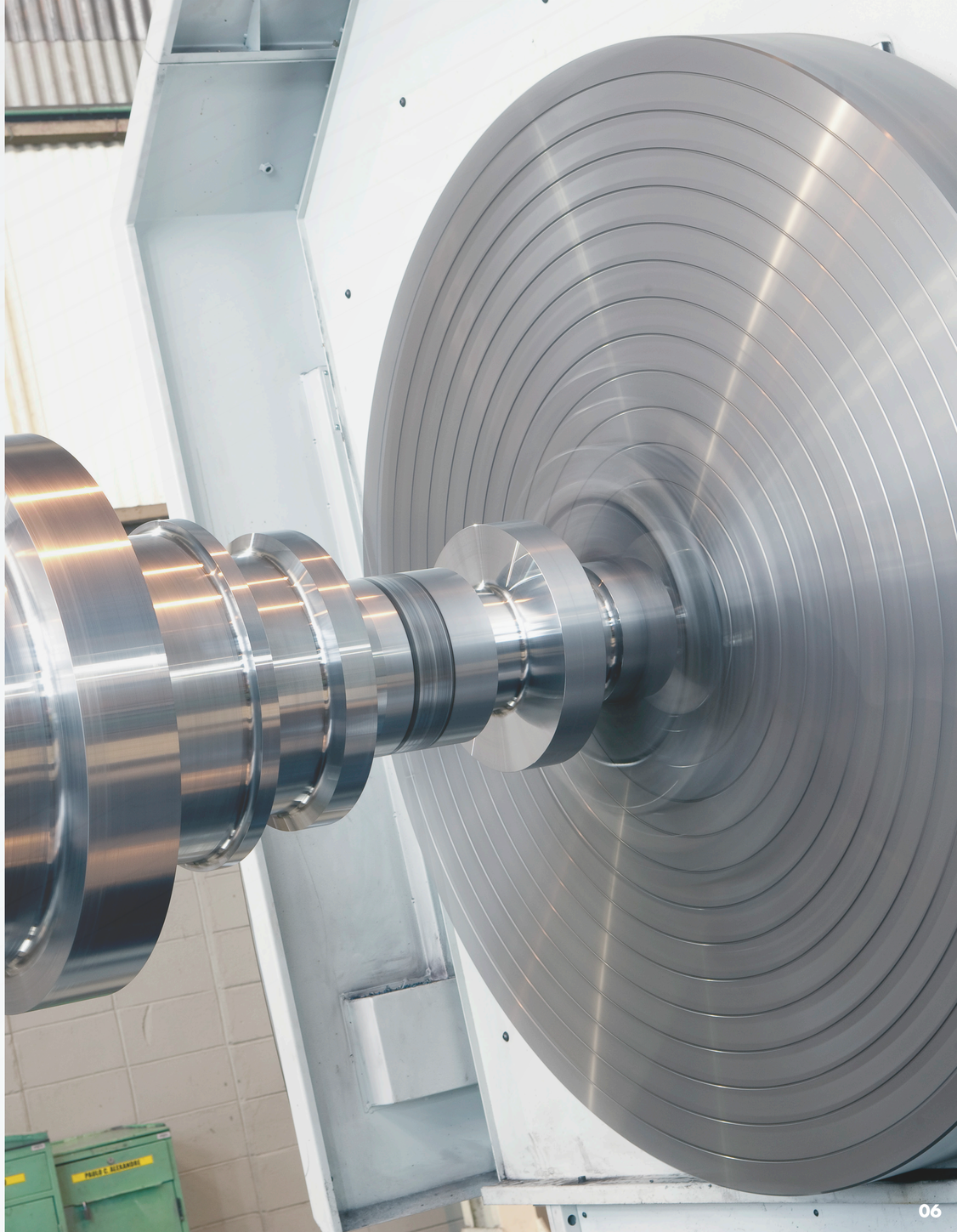
Machining Service Center

We are prepared to supply near finished parts and finished parts in steels and specialty steels. We count on high technology equipment.

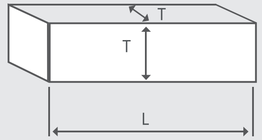
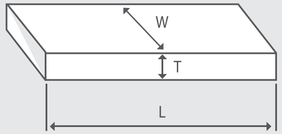
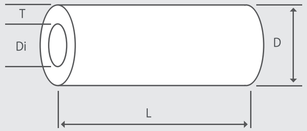
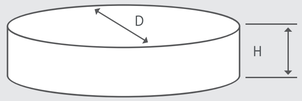
- Lathes
- Milling Cutters
- Treppaning Machines
- Peeling Machines
- Centerless Grinders
- Cold Drawing Benches
- Hot Drawing Benches
- Shaving Machines
- Straighteners
- Grinders

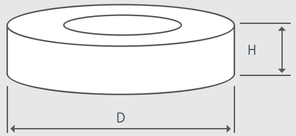
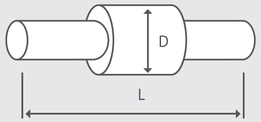
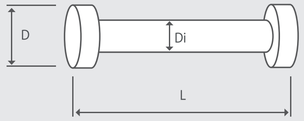
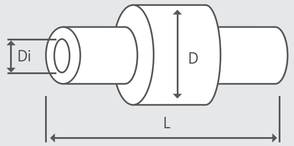
List of High Technology Equipment

Equipment	Maximum Weight (t)	Basic Characteristics	Qty.
Lathe Waldrich	100	ø max. 2030 mm Max lenght 15.000 mm	1
Lathe Innobra 2 and 3 (CNC)	10	ø max. 900mm (over the car) ø max. 1,080mm (over the lathe bed)	2
Vertical Dorries Lathe (CNC)	25	ø max. 3,400mm Max height.: 1,700mm	1
Romi Centur Lathe 180A (CNC)	40	ø max. 1,500mm Max length: 8,000mm	1
Romi Centur Lathe 180A (CNC)	40	ø max. 2,030mm Max length: 8,000mm	2
Farrel 2 Lathet (CNC)	40	ø max. 1,180mm (over the car) Max length.: 13,700mm	1
Promatek / Rocco Trepanning Machine	20	ø max. 1,800mm Boring max.: 505mm Max length. (boring): 14,000mm	2
Echea 4 Trepanning Machine	8	ø max. 500mm Max boring:ø165mm Max length (boring): 7,000mm	1
WMW Milling Cutter (CNC)	20	Bed dimension: 2,000 x 1,800mm Max height: 1,600mm	1
Broaching Machine 125	-	Max weight: Platform: 50 t Movable bed max weight: 12,5 t Longitudinal travel: 5,500mm Transverse travel: 500mm Max height: 2,700mm	1
Broaching Machine 160	-	Max weight platform.: 50t Movable bed max weight: 12,5 t Longitudinal travel: 7,000mm Transverse travel: 500mm Max weight: 3,000mm	1
Broaching Machine Table Type TOS (CNC)	20	Longitudinal travel:6,000mm Transverse travel: 3,200mm Max height: 3,500mm Bed dimension:2 x 3m	2
Horizontal Lathe Gurutzpe GLX16. 18.17	18	ø max. 1.300mm max lenght 17.000mm	1



Forged Parts Restraints

Product	Shape	Dimensions and Weight	(Rough Machined)	Limitations
Round Bars		D = 127 to 1,420mm L ≤ 14,000mm (turned) D = 142 to 1,480mm L ≤ 18,000mm (as forged) Weight ≤ 24,000 kg	D ≤ 240 => +2/-0 D > 240 => +3/-0 L => +10/-0	Bars with diameters larger than 650mm and length longer than 7,400 mm can only be supplied without heat treatment (upon consultation) or normalized or stress relieved (length up to 12,000mm). Bars with diameter up to 215mm can only be supplied with to length up tto 14,000mm.
Square Bars		T = 130 to 1,250mm L ≤ 12,000mm (machined) Weight ≤ 22,500 kg	T => +3/-0 L => +10/-0	Bars with thickness larger than 650mm and length longer than 7,400mm can only be supplied without heat treatment (upon consultation) or normalized or stress relieved.
Flat Bars		T = 130 to 1,250mm W = 130 to 2,300mm L ≤ 12,000mm (rmachined) (*) (Weight) ≤ 22,500 kg	T => +3/-0 W => +3/-0 L => +10/-0	Bars with thickness or width larger than 650mm and length longer than 7,400mm can only be supplied without heat treatment (upon consultation) or normalized or stress relieved. (*) Bars with width larger than 1,250mm must have a maximum area equal to a square bar area of 1,250mm.
Hollow Bars		D = 203 a 1,300mm Di = 65 a 505 T ≥ 50mm L ≤ 14,000mm	D ≤ 240 => +2/-0 D > 240 => +3/-0 Di => +/-1,5 L => +10/-0	The dimension of the holes depends on the available tools and dimension of the parts, but, in general, it varies from 65 to 505mm. Smaller holes can be supplied upon consultation, by subcontracting other machine shops. Bars with diameter larger than 650mm and length larger than 7,400mm can only be supplied without heat treatment (upon consultation) or normalized or stress relieved.
Disks (H < D)		D = 450 a 2,340mm H = 130 a 1,420mm Weight ≤ 22,500 kg	D => +3/-0 H => +10/-0	Parts with diameter from 900 to 2,340mm can only be supplied with a height **shorter** than 175mm and **taller** than 1,420mm, upon consultation. Parts with diameter larger than 1,900mm can only be supplied normalized.

Product	Shape	Dimensions and Weight	Tolerances (mm) (Rough Machined)	Restrictions
Rings (H < D)		D = 450 to 3,000mm Di ≤ 2,000 H = 130 to 1,420mm (Weight) ≤ 20,000 kg	D => +3/-0 Di => +0/-3 H => +10/-0	Sum of inner diameter and thickness must be = 2,200mm. Parts with external diameter larger than 1,900mm can only be supplied without heat treatment (upon consultation) or normalized. Parts with external diameter larger than 2,000mm can only be supplied with inner diameter larger than 200mm.
Sleeves (L > D)		D = 500 to 2,600mm Di = 380 to 2,000 L ≤ 4,300mm (Weight) ≤ 20,000 kg	D => +3/-0 Di => +0/-3 L => +10/-0	Sum of inner diameter plus thickness must be = 2,200mm. Parts with inner diameter larger than 650mm can only be supplied with length up to 2,500mm. Parts with length larger than 2,000mm can only be supplied with inner diameter in the as forged condition (upon consultation).
Solid Blanks		D = 127 to 1,600mm L ≤ 12,000mm (Weight) ≤ 22,000 kg	D => +3/-0 L => +10/-0	Parts with diameter larger than 650mm and length larger than 7,400mm can only be supplied without heat treatment (upon consultation) or normalized.
Flanged Shafts		D = 400 to 1,600mm D1 ≥ 250mm L ≤ 12,000mm (Weight) ≤ 20,000 kg	D => +3/-0 L => +10/-0	Parts with diameter larger than 650mm and length larger than 7,400mm can only be supplied without heat treatment (upon consultation) or normalized.
Hollow Blanks		D = 127 to 1,600mm Di = 65 to 505mm L ≤ 14,000mm (Weight) ≤ 20,000 kg	D => +3/-0 Di => +/-1,5 L => +10/-0	Sum of inner diameter and thickness must be = 2,200mm. Parts with external diameter larger than 1,900mm can only be supplied without heat treatment (upon consultation) or normalized. Parts with external diameter larger than 2,000mm can only be supplied with height about 200mm.

Solid blanks in the as forged condition and without heat treatment can be supplied upon consultation, up to 32,000 kg and length up to 18,000mm, depending on the relation between sections and lengths. The data in this table are only for guidance. The dimensions can vary as a function of the combinations between grade, shape and heat treatment.

Certifications - Quality System Management

Villares Metals' product line meets the API 6A standards.

- OHSAS 18001:2007 - Occupational Health and Safety Management Systems
- ISO 14001:2015 - Environmental Management Systems
- ISO 50001:2011 - Management System
- IATF 16949:2016 - Quality Management System
- ISO/IEC 17025 - Accredited Physical, Chemical and Metallographic Laboratories
- AS 91000 D - Aerospace Quality Management Systems Quality Management Systems - Requirements for Aviation, Space and Defense Organizations
- Nadcap - National Aerospace and Defense Contractors Accreditation Program/Heat Treatment Facilities and Non-Destructive Testing
- Directive 2014/68/EU
- Directive 305/11/EU/CPR (CE mark)
- AW 2000/WO/TRD100 - Pressurized Parts Application. Pressure Vessel Components.
- NORSOK - M650 - Oil & Gas Application

Heat Treatment

The Villares Metals' Heat Treatment Service Center offers complete solutions in Heat Treatment. It has state-of-the-art and high technology equipment, coupled with an efficient automatic control system, ensuring a perfect execution of the different thermal cycles. The correct selection of steel grade and its ideal heat treatment are required for maximum tool yield. For your convenience and greater tooling performance, our customers can count on Steel Grade and Heat Treatment from the same supplier.

Basic Services

- Vacuum furnace quenching
- Controlled atmosphere quenching
- Vacuum tempering
- Tempering in neutral atmosphere
- Annealing
- Solubilization under vacuum
- Ageing
- Sub-zero
- Stress relieving
- Plasma nitriding

Additional Services

- Pick-up and return of material within a 150 km radius
- Hardness, tensile strength and impact testing
- Metallographic analyses
- Failure analyses of dies and tools
- Technical services and application services
- Heat treatment reports
- Technical seminars for customers

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