



Since 1956 the reliable partner
of oil and gas equipment manufacturers

WORLDWIDE PRESENCE





OPEN DIE FORGINGS AND SEAMLESS ROLLED RINGS FOR OIL AND GAS

FOMAS Group manufactures open die forgings and seamless rolled rings, in any type of steel and non-ferrous alloys for the Oil & Gas sector:

- **Upstream**
- **Downstream**
- **Process Equipment**

Our decades of experience in the manufacturing of industrial components have made us an essential partner to our clients: our network of 10 production sites, strategically located across the globe (from America to Asia), allows the delivery of high integrity forgings to all our customers' worldwide locations with excellent lead times.

We share know-how within the Fomas Group, optimizing processes and materials, minimizing cost, and maximizing product quality.

Our added value is to provide **turnkey solutions**, from forging and ring rolling to the finished machined part.

Starting from a thorough analysis of the customer's design, then engineering the production of contour forgings close to net shape up to the finished part.

All the required machining processes such as milling, lathe-machining, drilling, sawing and others can be carried within our manufacturing units.

- Cutting-edge technology
- Quality
- On time delivery

Upstream

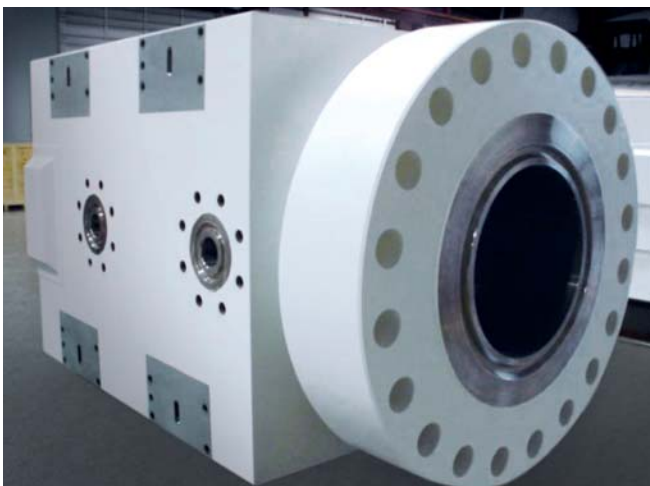


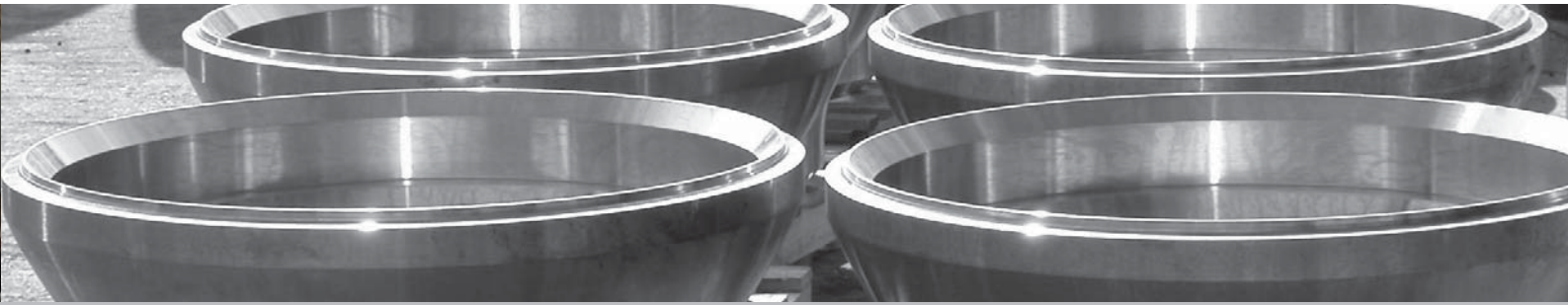
FORGINGS

- BOP (blow out preventer)
- Spool bodies
- Xmas tree
- Stinger launch pad
- Turret swivel core (FPSO)
- Top plate
- Rail

RINGS

- Connectors, riser flanges, clamps
- Actuator rings
- Annular bop
- Swivel ring
- Spool
- Hanger
- Well casing
- Top plate
- Housing
- Joint





FORGINGS

- Reactor vessels
- Wirings

RINGS

Flanges & valves

- Wn & lwn flange
- Swivel inner & outer
- Anchor flanges
- Closure
- Ball
- Body
- Seal ring



Process equipment



FORGINGS

- Pumps & compressor casing & cover
- Pump shafts
- Centrifugal compressor impellers

RINGS

- Flanges
- Shells
- Head junction

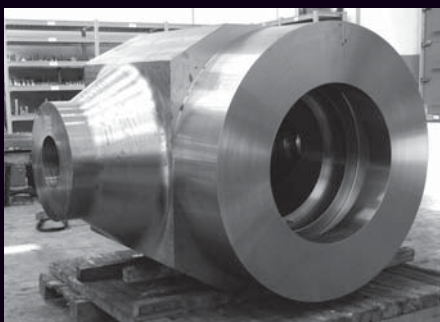


MATERIALS - Special steels, nickel and titanium alloys

Steel	Material Number	Uns-Designation	Din-identification	Alloy	Application
Austenitic Steels	-1,4302	S30400	X5CrNi18-10	F304	Nuclear, Oil&Gas
	-1,4306	S30403	X2CrNi19-11	F304 L	
	-	S30454	X5CrNi18-10	F304 LN	
	-1,4841	S31000	X15CrNi25-21	F310	
	-1,4401	S31600	X5CrNiMo17-12-2	F316	
	-1,4404	S31603	X2CrNiMo17-12-2	F316 L	
	-1,4406	S31653	X2CrNiMoN17-11-2	F316 LN	
	-1,4541	S32100	X6CrNiTi18-10	F321	
	-1,4550	S34700	X6CrNiNb18-10	F347	
Super austenitic Steels	-1,4961	S34709	X8CrNiNb18-10	F347 H	Aerospace, Nuclear,Oil&Gas
	-1,4454	S21904	X2CrMnNiN20-9-7	F XM-11 / Nitronic 40	
	no	S20910	X3CrMnNiN22-5-12	F XM-19 / Nitronic 50	
	-1,4547	S31254	X1CrNiMoCuN20-18-7	F44	
Martensitic Steels	-1,4565	S34565	X2CrNiMnMoNbN25-18-5-4	F49	Oil&Gas
	-1,4413	S41500	X3CrNi13-4	F6NM	Oil&Gas,Process Equipment
	-1,4006	S41000	X12Cr13	F6 a	
	-1,4923	-	X22CrMoV12-1	-	Oil&Gas,Process Equipment,Power Generation
	-	-	X4CrNi16-4	Virgo 38	Oil&Gas,Process Equipment
	1,4939	-	X12CrNiMo12	Jethete M 152	Oil&Gas,Process Equipment,Power Generation
Martensitic Creep-resistant Steels	-	-	X14CrMoVNBn	Cost F	Power Generation, Gas Steam Turbine components
	-	-	X12CrMoWVNBn	Cost E	
	-	-	X13CrMoCoVNBnB	FB2	
	X10CrMoVNB9-1	K90901	X10CrMoVNB9-1	F91	Power Generation, Steam Valves, Pressure Vessel
	-	K92460	-	F92	
Stainless Precipit. Hardening Steels	-1,4545	-	-	15-5 PH	Aerospace, high-strength corrosion resistant components
	-1,4542	S17400	X5CrNiCuNb16-4-4	17-4 PH	
Duplex & Superduplex Stainless Steels	-1,4462	S31803	X2CrNiMoN22-5-3	F51	Oil&Gas,FSPO platforms
	-1,4410	S32750	X2CrNiMoN25-7-4	F53	Oil&Gas, Pumps, Valves
	-1,4501	S32760	X2CrNiMoCuWN25-7-4	F55	
	-1,4507	S32550	X2CrNiMo25-7-4	F61	
Superalloys		N08120	NiFeCr	HR120	Power generation, shrouds, diaphragms, heat shields, turbine stage
	2,4683	R30188	CoCr22NiW	Haynes 188 / Udimet 188	
	2,4733	N06230	NiCr22W14Mo	Haynes 230	
	2,4831 / 2,4856	N06625	NiCr22Mo9Nb	Inconel 625	Pressure Containers, Oil&Gas
	2,4642	N06690	NiCr29Fe	Inconel 690	
	2,4668	N06718	NiCr19Fe19Nb5Mo3	Inconel 718	Power Generation, Turbine components, Aviation, Oil&Gas, Nuclear
	2,4665		NiCr22Fe18Mo	Hastelloy X / Inconel HX	
	2,465	N07236	NiCo20Cr20MoTi	Nimonic 263	Power generation, shrouds, diaphragms, heat shields, turbine stage
				GTD333	
	1,4876	N08810	X10NiCrAlTi32-21	Incoloy 800H	Nuclear, Oil&Gas
	1,4944	no	no	A-286	Power Generation, Oil&Gas
Carbon & Low Alloys Steels				SA 105	Oil&Gas, General Industry
				SA 266	
				A 266 CL2	
				SA 350 LF2	
				SA 508 Grade 3 CL1 /CL2	
				A48 CP-APR	
				20 Mn 5	
				16 MnD 5	
				18 MnD 5	
				20 MnMoNi 55	
				A 694 F52	
				A 694 F60	
				A 694 F65	
				A 694 F70	
				A 707 Grade 3W	
				15NiCuMoNb5	
				SA 350 LF3	
				A 350 LF6	
	1,5421	K12822	20MnMo3-5	SA 336 F1	
	-1,7362	K41545	X11CrMo5	SA 336 F5	
		K11572	no	SA 336 F11	
	-1,7337	K11564	16CrMo4-4	SA 336 F12	
	no	K31545	no	SA 336 F21	
	1,738	K21590	10CrMo9-10	A 182 F22	
	no	K31835	12CrMoV9-10	A 182 F22V	
	-1,7214	no	30CrMo4	AISI 4130	
	1,7225	no	42CrMo4	AISI 4140	
				39NiCrMo3	
				A 470 CL8	
				A 522 Type1	
				20 NCD 12	
				15 Mo 3	



References



References

AKER SOLUTIONS

Main Components	Materials
Spool body	F22 8630

CAMERON

Main Components	Materials
BOP (single, double, triple)	F22
BOP (annular)	4130
<i>Riser flanges</i>	4140
<i>Top Plate, Piston, Body,</i> <i>Upper and Lower Housing,</i> <i>Bonnet,</i> <i>Collect Segments,</i> <i>Clamp</i>	
Diverter	
Spool	
Manifold	

FMC

Main Components	Materials
Xmas tree	F22
Spool body	8630
Caisson separator booster	

GE OIL & GAS (VETCO GRAY-HYDRIL)

Main Components	Materials
BOP (single, double, triple)	F22
BOP (annular)	8630
<i>Subsea wellhead</i> <i>Tension ring</i>	4130

MAN TURBO

Main Components	Materials
Compressor body	F51
Centrifugal impeller	Inconel 718

NATIONAL OILWELL VARCO

Main Components	Materials
BOP (single, double, triple)	F22
BOP (annular)	4130
<i>Piston</i> <i>Body</i> <i>Upper and Lower Housing</i> <i>Riser flanges</i>	
Internal/external housing	



OIL STATES INDUSTRIES

Main Components	Materials
Collet	F22
Hub	HIHOS
FPSO components	4130
Connectors <i>Pin and Box</i>	F60

SBM

Main Components	Materials
Rail	F51
Turret-swivel core	4130
FPSO	4140
<i>Axial Bogie</i>	F316
<i>Guiding wheel</i>	
<i>Radial Bogie</i>	

SIEMENS

Main Components	Materials
Centrifugal impeller	17-4 PH
Bullgears	Inconel 718
Casing/housing	F6NM

SULZER PUMPS

Main Components	Materials
Barrel pump	F53

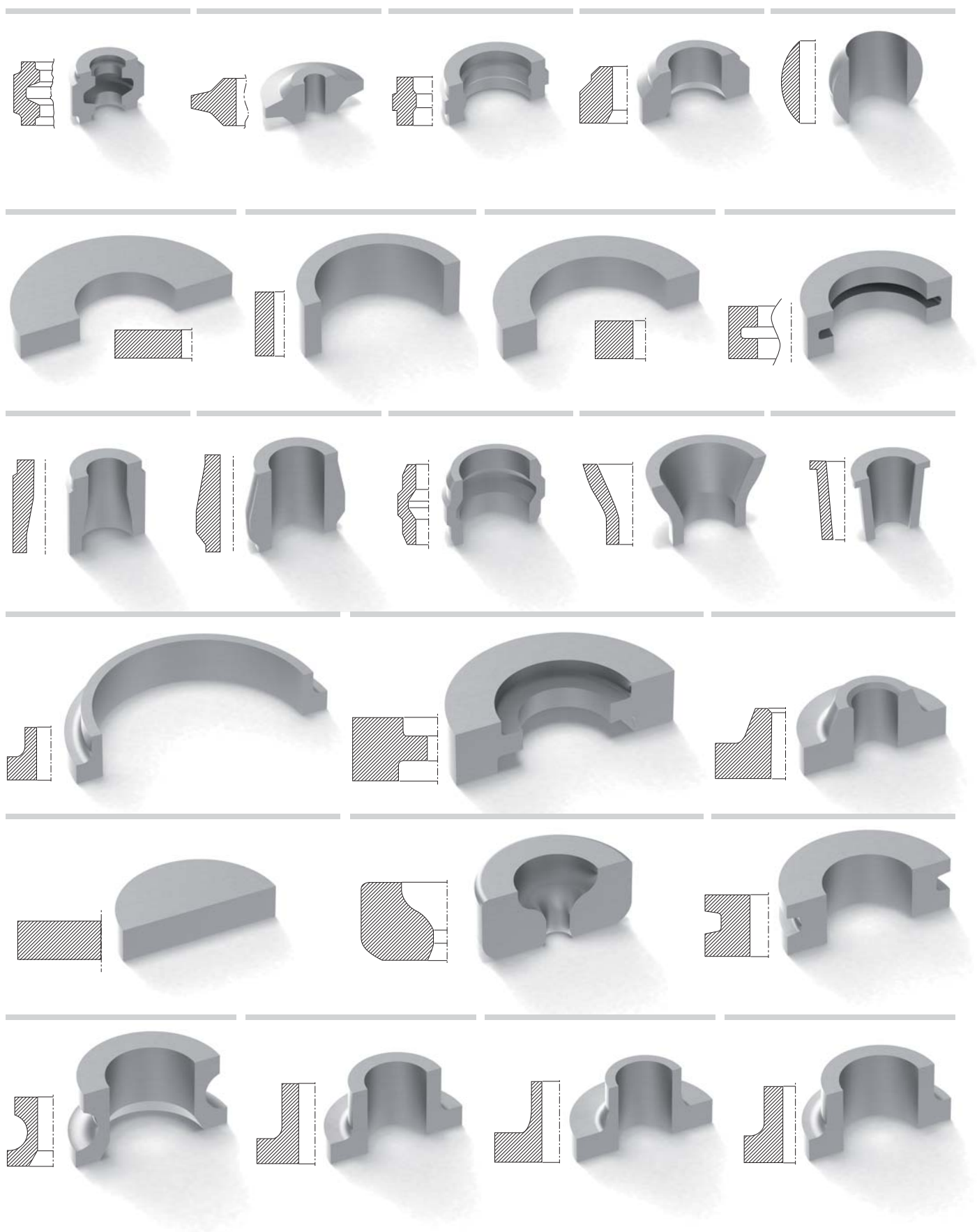
TYCO VALVES

Main Components	Materials
Valve body	F22
	F51



Profiled shapes of rolled rings







THE GROUP

FOMAS Group is an established global partner for Oil & Gas applications, with **dedicated engineering and production** of open die forgings and seamless rolled rings in the widest variety of steels and alloys with the highest levels of quality and delivery service.

The Group has over 1,450 employees all around the world. Working with us signifies entering a team which is focused on continuous evolution, a company that measures its success in the achievement of excellence at each and every step of function and process.

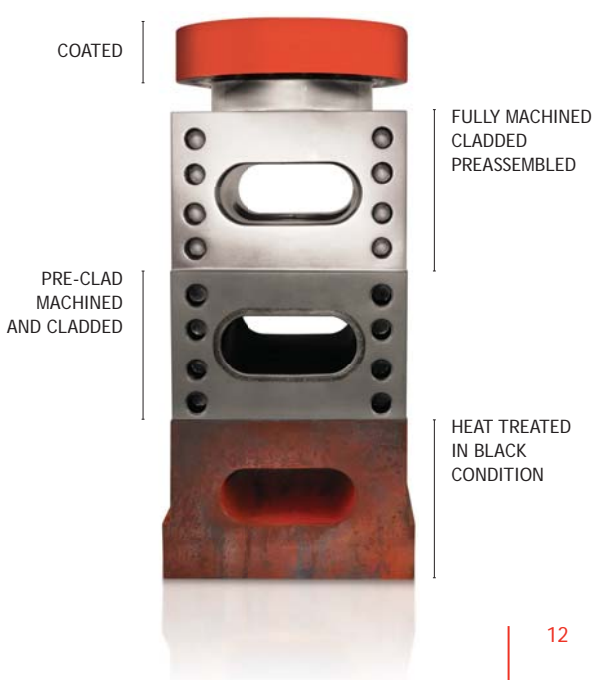
All plants are equipped with state of the art **process technology** and our global steel sources are qualified and approved by meeting the same FOMAS high demanding standards, aiming to optimize processes and materials, minimize costs and maximizing product quality.

We provide **turnkey solutions**, from forging and ring rolling to the finished machined parts, establishing **reliable partnerships** with customers based on our strengths:

- Cutting-edge technology
- Quality
- On time delivery

Also, our dedicated project management guarantees an added value that offers customers co-design solutions.

1,450
employees



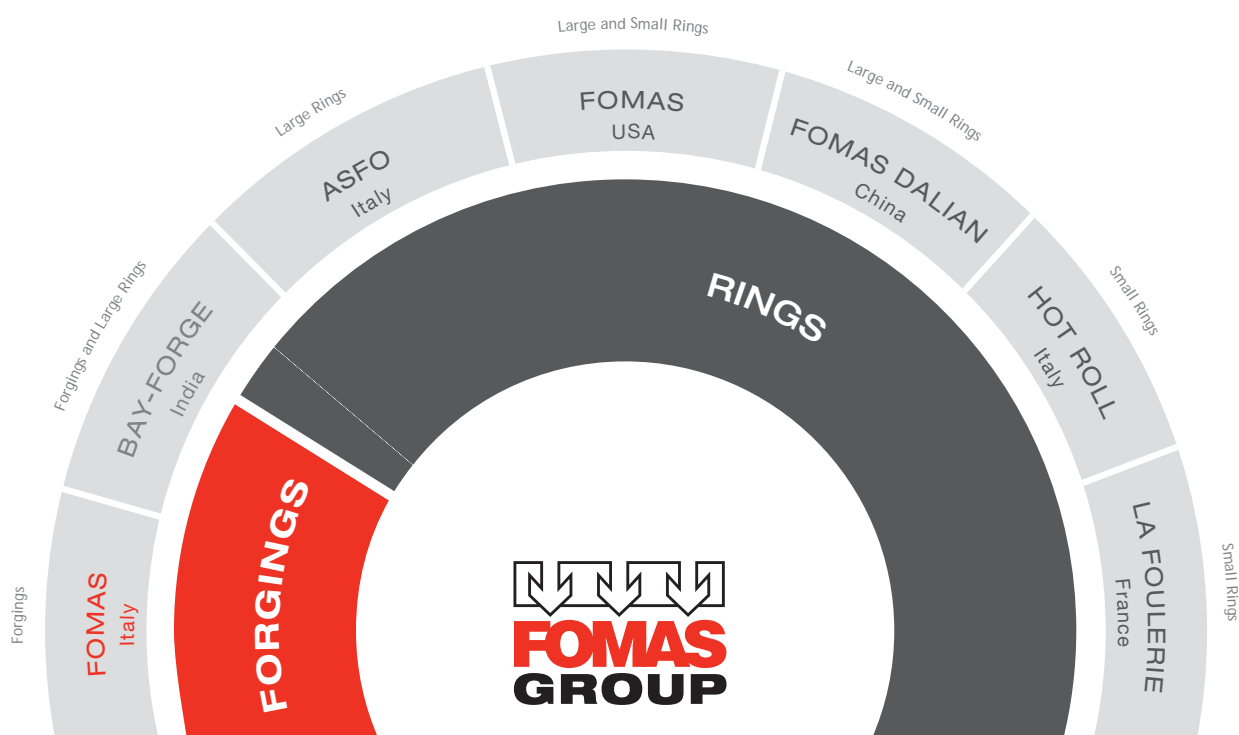
at the heart of forging®



ANULAR BOP
Monoblock F22



FOMAS GROUP STRUCTURE



average
200,000 tons
raw material purchased per year

POWER GENERATION

Steam
Gas
Hydro
Geothermal
Nuclear
Wind

OIL and GAS

Upstream
Downstream
Process Equipment

MOBILITY/TRANSPORTATION

Automotive
Industrial Vehicles
Aerospace
Railway
Ship Industry

CONSTRUCTION EQUIPMENT

Construction
Mining
Tunnelling

GENERAL INDUSTRY

Dies & Rolls
Agriculture
Chemical Process Equipment
Fluid Handling

GEARS TRANSMISSIONS & BEARINGS

Gear Boxes
Speed Reducers
Gear
Ultra Large Bearings

SPECIAL STEELS and ALLOYS





FORGINGS

Actual as forged weight and dimension limits

- max. diameter: 5,500 mm (216")
- max. length: 18,000 mm (700")
- max. ingot: 125 ton ESR (275,000 lbs)
(equivalent to 170 tons / 374,000 lbs convent. ingot)
- max. shipped weight: 100 ton (220,000 lbs)

Six state of the art automatic UT stand both vertical and horizontal, produced on FOMAS design and qualified by the major turbine manufacturers.

Titanium and Aluminium heat treatment production line equipped with electric drop furnace.

Presses

The forgings are processed in smaller or larger presses depending on the contours and size.

Our presses for open die forgings
(all with integrated manipulators):

- 12,500 ton
- 6,000 ton
- n° 2 - 3,500 ton
- 2,000 ton

Electro Slag Remelting plant

- Three ESR stands
- New 125 ton ESR ingot equivalent to a conventional ingot of 170 ton.
- Pressurised ESR for top quality remelting of special steel & stainless steel under full inert gas atmosphere.

Horizontal spray-quench

- Differential heat treatment
- Fully control on drasticity
- Cooling zone control
- Time evolution of drasticity control
- Full rotor stability due to rotation
- Very uniform properties
- Plc controlled >> fully reproducible process (no variance)
- Full control on position/distance of nozzles
- Green process







RINGS

- max. ring diameter: 7,000 mm (275.5")
- max ring height: 1,250 mm (49")
- max ring weight: 20 ton (44,000 lbs)
- max ingot weight: 40 ton

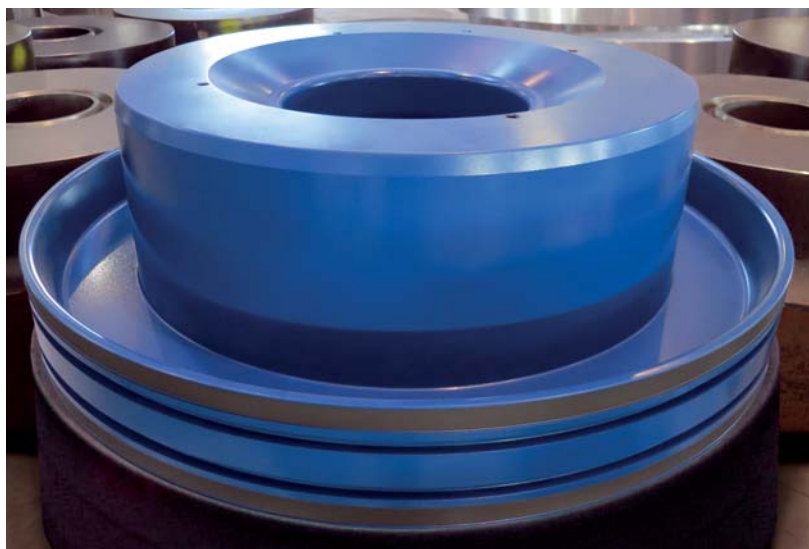
State of the art in-house heat treatment plants, with an automated mobile conveyor for loading/unloading operations.

This means quick, consistent and optimized transfer time from furnace to tank.

Rolling Mills

19 lines (axial/radial)

Our production sites across the globe roll approximately 105,000 tons of rings per year.





	WEIGHT		D ext		HEIGHT	
	kg	pounds (lb)	mm	inches	mm	inches
HOT ROLL	1-10	2-22	120-270	4.5-11	30-110	1-4
HOT ROLL	5-40	11-88	150-450	5.5-18	30-170	1-7
HOT ROLL	1-6	2-13	140-220	5.5-9	25-40	0.9-1.5
HOT ROLL	15-80	33-176	200-900	7.5-35	30-200	1-8
HOT ROLL	8-40	17-88	150-600	5.5-24	30-165	1-6.5
LA FOULERIE	1-6	2-13	100-400	3.5-16	30-85	1-3.5
LA FOULERIE	8-25	17-55	160-480	6-19	30-130	1-5
LA FOULERIE	3-15	6-33	160-450	6-18	30-130	1-5
LA FOULERIE	10-50	22-110	200-500	7.5-20	65-200	2.5-8
LA FOULERIE	5-20	11-44	150-400	5.5-16	30-160	1-6.5
DALIAN	2-20	4.4-44	180-500	7-20	30-160	1-6.5
DALIAN	6-80	13-44	300-1150	11.5-45	30-200	1-8
DALIAN	80-2000	44-4.40	300-2500	11.5-99	40-700	1.5-27.5
FOMAS USA	70-1,600	150-3.500	360-3,000	14-120	50-500	2.0-20.0
FOMAS USA	6-68	15-150	200-635	8-25	30-160	1.2-6.0
ASFO	80-15000	44-330	2500	99	500	19.6
ASFO	80-15000	44-330	4500	177	1100	43.5
ASFO	80-15000	44-330	7000	275.5	1250	49
BAY-FORGE	20000	44.000	5500	216	1000	39



CERTIFICATIONS

All the Group's Companies are certified with:

- ISO 9001 Det Norske Veritas (DNV)
- ISO 14001 Environmental Management (DNV)
- BS OHSAS 18001 Occupational Health and Safety (DNV)

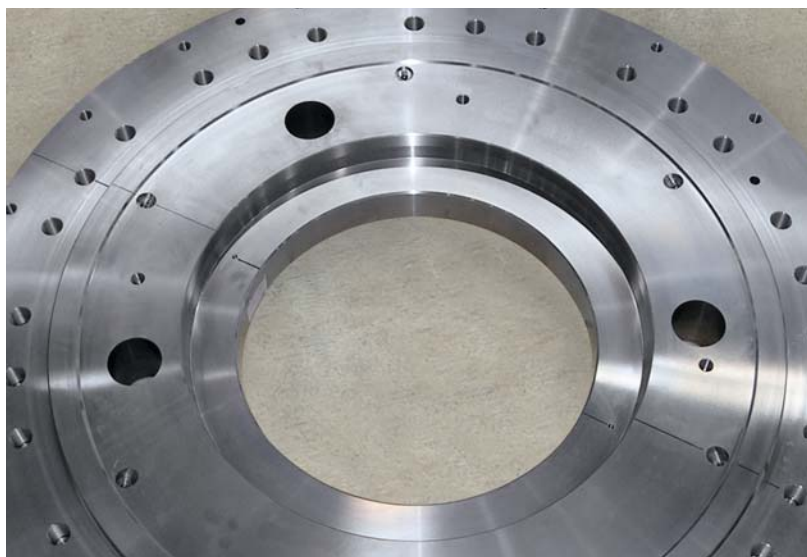
Moreover each company is certified by the most prestigious institutes in specific sectors.

FOMAS Group's central research and development department aims to respond to customer needs. We often provide, on request co-design solutions. Our approach is to focus on safety, cost reduction, minimize end waste. Moreover we strive to sustain profitability providing the highest level of quality and safety throughout the entire manufacturing cycle and at the same time ensuring the least possible impact on the environment.

QUALIFICATIONS

Among many of our qualifications, we hold:

- Norsok M-650 Rev.4 per F51
 - Qualified thickness: 350 mm
- Norsok M-650 Rev.4 per F53 - F 55
 - Qualified thickness: 180 mm up to 220 mm





TURRET SWIVEL CORE
27 Ton forged
Weight - duplex F51
FOMAS ESR remelted quality



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