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PROFILE

JINDAL GROUP
&
JINDAL FITTINGS LTD- PROFILE

COMPANY PROFILE AND DETAILS OF GROUP COMPANIES

COMPANY PROFILE – JINDAL GROUP

The Jindal Group is a US$ 18 billion conglomerate, which over the last three decades has emerged as one of India's most dynamic business organizations. The Jindal Group was founded in 1952 by steel visionary Shri O. P. Jindal, a first-generation entrepreneur who started an indigenous single-unit steel plant in Hisar, Haryana.

Over the last 3 decades the Group has grown to be a US$ 18 billion, multi-national and multi-product steel conglomerate with business interests spanning across mining, power, industrial gases, port facilities, and steel making. Growth has been a way of life for the Jindal Group and its motto all along has been 'Growth with a social conscience'. The group places its commitment to sustainable development, of its people and the communities in which it operates, at the heart of its strategy and aspires to be a benchmark in this direction for players in the industry world over.

The group's strength lies in dynamic and aggressive approach of the leaders of the group. These leaders are none other than four sons of Shri O. P. Jindal. Their appetite for growth is enormous and they have a clear vision of being recognized as best in the industry by consolidating its core strengths. Presently the group has manufacturing outfits across India, US, UK and Indonesia and mining concessions in Chile, Bolivia, Indonesia & Mozambique and marketing representative's offices across the globe. Under their leadership the group companies have grown by leaps and bounds.

The group has already announced its intention to set up Greenfield steel plants and power plants in the state of West Bengal, Jharkhand, Orissa, Rajasthan, Maharashtra and Karnataka. The group is continuously on the lookout for acquiring various Iron ore and Coal mines, critical inputs in steel making.

The technology driven group employs over 50,707 people across the globe. Shri O. P. Jindal over the years built a reputation of integrity and dynamism and his four sons are today continuing with his rich legacy. Now headed by Smt. Savitri Devi Jindal, the group is still expanding, integrating, amalgamating and growing.

GROUP COMPANIES

Jindal Stainless Ltd
India's largest integrated manufacturer of stainless steel.

JSW Steel Limited
India's largest integrated galvanizing facilities in the private sector, engaged in hot rolling, cold rolling and galvanizing, has an environment-friendly integrated steel plant manufacturing HR coils using the revolutionary Corex technology for iron-making.

Jindal Steel & Power Limited
Asia's largest, and the world's second largest coal-based sponge iron plant, also manufacturing rails, blooms and power.

Jindal SAW Limited
A Total Pipe Solutions company manufacturing and marketing Large Diameter Submerged Arc Welded pipes, Seamless tubes & pipes and Ductile Iron pipes.

Jindal United Steel Corporation
Manufacturing steel plates for use in large diameter pipes, and in the construction and fabrication industries.

Jindal Thermal Power Company Limited
Producing power from coal as well as gas.

Jindal Praxair Oxygen Company Limited
The world's largest Air Separation Plant, in joint venture with Praxair Inc, supplying oxygen for the Group's iron and steel making operations.

Vijayanagar Minerals Private Limited
A joint venture for mining iron ore.

JINDAL SAW LIMITED

At Jindal SAW, the end of a pipe is not seen as a conclusion, but a beginning in itself. The start of endless possibilities! Of development, of expansion, of sustained growth that helps the globe and the lives of people.

It is this belief that propels Jindal SAW's continuous growth and makes it an integral part of the US$ 18 billion O.P. Jindal conglomerate. A multi-product and multi-location company,

Jindal SAW with its proximity to ports and easy connectivity has a unique locational advantage. Moreover, with manufacturing facilities at strategic points across India, the company has a distinct edge over competition. What gives Jindal SAW a further edge is the latest technology that it acquires by way of international collaborations and tie-ups. Also adding sheen is the constant focus on in-house research and human resources that separate the company from others and place it a step ahead of all.

Realising the need of the hour to become key players in global infrastructure development, Jindal SAW has made phenomenal strides in the field of Oil & Gas, Water transportation and Wastewater management.
Over the years Jindal SAW has continued to gain the confidence and trust of its stakeholders – from employees, associates, shareholders and people whose lives have benefitted by the company's endeavors. With its vision of sustainable development firmly in place, Jindal SAW has played a leading role in developing livable cities across the world - that in turn has helped transform the lives of people staying in them.

Ensuring timely transportation of oil, gas and water, Jindal SAW helps residents and organizations in numerous cities function efficiently. The pipes produced by the company are energy efficient, reduce dependence on fossil fuels, and help conserve natural resources like water.

At the very core of Jindal SAW is imprinted the conviction of never being content with the success attained and it is constantly striving for newer horizons. New boundaries, new challenges and new opportunities keep the company driven to surge ahead. Venturing forward into different areas of businesses with Jindal ITF, the infrastructure arm of Jindal SAW, the company is making rapid progress in urban services sectors with:

- Water, Wastewater and Solid Waste Management
- Domestic Transport and Logistics
- Transportation Equipment Fabrication

Having identified the immense potential offered by these sectors for the future, JITF has diversified into five business verticals in these areas: JITF Ecopolis, JITF Aquasource, JITF Vector, JITF Shipyards, and Jindal Rail Infrastructure.

COMPANY PROFILE – JINDAL FITTINGS LTD.

JNDAL FITTINGS LTD. is a subsidiary of Jindal SAW Limited, India which is a part of large industrial O.P. Jindal Group having business turnover in access of USD 18 Billion.

Jindal SAW Limited, India, established in the year 1984, has three Strategic Business Units (LSAW, Seamless and Ductile Iron Pipes) with regional offices located in different parts of the World and employs more than 6500 people.

Jindal SAW Limited manufactures Ductile Iron (DI) pipes and Fittings with the annual capacity of approx. **980,000 MT** at the following strategic locations across the Globe:

1. Jindal SAW Limited, India (Annual Capacity: 550,000 MT with size range of DN80 to DN1000)
2. Jindal SAW Gulf LLC, Abu Dhabi (Annual Capacity: 350,000 MT with size range of DN200 to DN2200)
3. Jindal SAW Italia SPA, Italy (Sertubi) (Annual Capacity: 80,000 MT with size range of DN60 to DN800)
4. Jindal Fittings Ltd., India (Annual Capacity: 18,000 MT with size range DN80 to DN2200)

Jindal Fittings Ltd. is the largest state of art integrated plant in India producing Ductile Iron Fittings with diameter range from DN 80 mm to DN 2200 mm to cater the huge requirement of infrastructure projects, mainly associated to **potable and waste water transmission & distribution projects.**

COMPANY PROFILE – JINDAL FITTINGS LTD.

Jindal Fittings Ltd. is accredited with ISO 9001:2008 management Certification to manufacture Ductile Iron Fittings in MIDC, Tembhurni, Solapur, Maharashtra (India). The plant is equipped with best quality equipment sourced from Europe and other countries to produce world class Ductile Iron Fittings and follows stringent quality controls at every stage to create a product of international repute.

Ductile Iron Fitting's manufacturing ranges from **DN 80 – DN 2200**. The product supply shall conform to International Standards ISO: 2531, BSEN: 545 & BSEN: 598.

At **Jindal Fittings Ltd.**, quality isn't merely a set of predetermined standards to be adhered to.

It has many more dimensions: Quality of thought, Quality of actions, Quality of people, and above all, Quality of products and processes. Quality Assurance is in-built into each stage of production from raw material purchase to finished goods handling.
Each department meticulously adheres to the prescribed tests and inspections.

The company's proven ability to meet the world's toughest quality assurance guidelines means high quality products, even for the most demanding line pipe applications.

COMPANY PROFILE – JINDAL FITTINGS LTD.

Jindal Fittings Ltd. – Product and Specifications:

Jindal Fittings Ltd.	Plant Capacity - 18,000 MT
Size Range	80 mm – 2200 mm
Class of Fittings	C25, C30, C40, C50, C64, K12*, K14*
Joints	Socket and Spigot Joints (Push-on-joints)
	Flanged Joints (PN 10, PN 16, PN 25, PN 40).
Reference Specifications	ISO 2531/2009; BS EN 545/2010;
	BS EN 598/2007
Type of Linings	Internal Cement Mortar with various options of Cements i.e. OPC, BFSC, SRC, HAC, FBE Coatings
Type of Coatings ADDITIONAL COATINGS	Zinc– 130 gm/m2; Finishing layer : Blue/ Red Epoxy or Black Bitumen; Fusion Bonded Epoxy (FBE) Coating

* K12/K14 Fittings can be offered as per ISO 2532/1998 & BSEN 545/ 2006

MILESTONES

MILE STONES

1986	:	Country's first LSAW Pipes (U-O-E) Mill for Line Pipes commissioned at Kosi Kalan with API and ISO accreditation
1992	:	Bevelling Unit Commissioned at Kosi Kalan SAW Pipes, USA incorporated and commissioned
1993	:	First major supply of NACE Pipes for Offshore line
1994	:	Seamless Pipes and Tubes Division Commissioned at Nashik 3LPE/FBE Coating Plant commissioned at Kosi Kalan
1995	:	First Export order is executed for Line Pipes
1996	:	CTE Mobile Coating Plant commissioned at Kosi Kalan
1997	:	Hot Induction Bends Unit established at Kosi Kalan Start up of 4 meter wide Plate Mill at Baytown, USA
1999	:	Port-based 100% Export Oriented LSAW & HSAW Line Pipe Plants Commissioned at Mundra with API and ISO accreditation Internal Coating Plant commissioned at Kosi Kalan
2000	:	3 LPE/FBE Coating Plant commissioned at Mundra Internal Coating Plant commissioned at Mundra
2002	:	Concrete Weight Coating Plant re-commissioned at Mundra Bevelling Unit commissioned at Mundra

MILE STONES…….Contd

2003	:	Additional Plant for 3LPE/FBE commissioned at Mundra
2004	:	Third LSAW manufacturing facility commissioned at Samaghogha near Port Mundra with accreditation from API and ISO
2005	:	Start up of Integrated Pipe Unit Ductile Iron Pipe manufacturing plant of 300,000 MT per annum capacity along with Blast Furnace
2009	:	Entered into Joint Venture with “Sigma Commercial Products Ltd” for supply of Ductile Iron Fittings and Accessories from U.K.
2012	:	Start up of the New Ductile Iron Pipe manufacturing Facility in Abu Dhabi, UAE with a capacity of 350,000 MT per annum
2013	:	Start up of the New Small dia Ductile Iron Pipe manufacturing Facility in Samaghogha, India with a capacity of 200,000 MT per annum
2013	:	JV Company ‘Sigma Commercial Products Ltd’ name changed to ‘Jindal SAW Pipeline Solutions Ltd.
2014	:	Start up of the New Ductile Iron Fittings manufacturing Facility in Tembhurni, India with a capacity of 18,000 MT per annum in size range DN 80 to DN 2200.

ISO 9001:2008

BUREAU VERITAS
Certification

JINDAL FITTINGS LTD.

B-13, MIDC, TEMBHURNI, TAL. MADHA, DIST. SOLAPUR – 413 211,
MAHARASHTRA, INDIA.

Bureau Veritas Certification certify that the Management System of the above organization has been audited and found to be in accordance with the requirements of the management system standard detailed below

Standard

ISO 9001:2008

Scope of certification

Manufacturing and supply of Ductile Iron Fittings for Pipes used in water, waste water and sewerage application

Certification cycle start date: **03 June 2014**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: **02 June 2017**

Original certification date: **03 June 2014**

Certificate No. **IND14.6313U** Version : 1 Revision date: **03 June 2014**

Certification Authority
RAMESH KOREGAVE
General Manager

UKAS MANAGEMENT SYSTEMS
008

Certification body address: *Brandon House, 180 Borough High Street, London SE1 1LB, United Kingdom.*

Local office: *"Marwah Centre" 6th Floor, Krishanlal Marwah Marg, Opp. Ansa Industrial Estate, Off Saki Vihar Road, Andheri (East), Mumbai – 400 072, India.*

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization. To check this certificate validity please call **+91 22 6695 6300.**

PRODUCT CONFORMITY CERTIFICATION
ISO 2531 / BS EN 545 / BS EN 598

BUREAU VERITAS
Certification

Certificate of Conformity

Awarded to

JINDAL FITTINGS LIMITED
A subsidiary of Jindal Saw Ltd

HEAD OFFICE
28, Shivaji Marg, New Delhi – 110015, INDIA

PRODUCTION PLANT:
PLOT NO: B-13, MIDC Tembhurni Taluka – Madha, District: Solapur Maharashtra – 413211, INDIA

Bureau Veritas Italia S.p.A. certify that the following products:

Ductile iron fittings for pipes for water pipelines
from DN 80 to DN 1200mm, DN 1400mm

produced by JINDAL FITTINGS LIMITED
have been evaluated and found in conformity against the requirements of the following standard*:

EN 545:2010
ISO2531: 2009
Ductile iron pipes, fittings, accessories and their joints for water application

*Standards for coatings see Appendix 1/1
Certification according requirements stated in:

RT ACCREDIA 06
I&F-IT-TQR-ORG-REG-02 REV 07.2014

Original Emission Date:	04/09/2014
Last emissione date :	04/09/2014
Expiration Date:	03/09/2017

Subject to the continued satisfactory operation, to check this certificate validity please refer to website: www.certification.bureauveritas.it.
Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organisation.

LODOVICO JUCKER – LOCAL TECHNICAL MANAGER

Date: 04/09/2014

Certificate N°: **830/001A**

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

SGQ N° 009A
SGA N° 008D
PRD N° 009B
SCR N° 008F
FSMS N° 003J
PRS N° 076C

Membro degli Accordi di Mutuo Riconoscimento EA e IAF
Signatory of EA and IAF mutual Recognition Agreements

BUREAU VERITAS
Certification

Appendix 1/1 to the certificate of conformity
Bureau Veritas Italia S.p.A.

N° 830/001A of 04/09/2014

Awarded to

JINDAL FITTINGS LIMITED
A subsidiary of Jindal Saw Ltd

HEAD OFFICE:
28, Shivaji Marg, New Delhi – 110015, INDIA

AND PRODUCTION PLANT:
PLOT NO: B-13, MIDC Tembhurni Taluka – Madha, District: Solapur Maharashtra – 413211, INDIA

The Applied Coatings have been evaluated and found in conformity against the requirements of the following standards:

ISO 4179:2005

Ductile iron pipes and fittings for pressure and non-pressure pipelines – Cement mortar lining

ISO 8179–2:1995

External zinc coating -- Part 2: Zinc rich paint with finishing layer of Bituminous product/synthetic resin/epoxy

EN 14901:2006

Epoxy coating (Fusion bonded powder or liquid two-pack) of ductile iron fittings and accessories

ISO 16132:2004

Ductile iron Pipes and fittings - Seal Coat for Cement mortar lining

Data: 04/09/2014

Certificato N°: **830/001A**

BUREAU VERITAS
Certification

Certificate of Conformity

Awarded to

JINDAL FITTINGS LIMITED
A subsidiary of Jindal Saw Ltd

HEAD OFFICE
28, Shivaji Marg, New Delhi – 110015, INDIA

PRODUCTION PLANT:
PLOT NO: B-13, MIDC Tembhurni Taluka – Madha, District: Solapur Maharashtra – 413211, INDIA

Bureau Veritas Italia S.p.A. certify that the following products:

Ductile iron fittings for pipes for water pipelines
from DN 80 to DN 1200mm, DN 1400mm

produced by JINDAL FITTINGS LIMITED
have been evaluated and found in conformity against the requirements of the following standard*:

EN 545:2006
ISO2531: 1998
Ductile iron pipes, fittings, accessories and their joints for water application

*Standards for coatings see Appendix 1/1
Certification according requirements stated in:

RT ACCREDIA 06
I&F-IT-TQR-ORG-REG-02 REV 07.2014

Original Emission Date:	04/09/2014
Last emissione date :	04/09/2014
Expiration Date:	03/09/2017

Subject to the continued satisfactory operation, to check this certificate validity please refer to website: www.certification.bureauveritas.it.
Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organisation.

LODOVICO JUCKER – LOCAL TECHNICAL MANAGER

Date: 04/09/2014

Certificate N°: **830/001B**

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

SGQ N° 009A
SGA N° 008D
PRD N° 009B
SCR N° 008F
FSMS N° 003I
PRS N° 076C

Membro degli Accordi di Mutuo Riconoscimento EA e IAF
Signatory of EA and IAF mutual Recognition Agreements

BUREAU VERITAS
Certification

Appendix 1/1 to the certificate of conformity
Bureau Veritas Italia S.p.A.

N° 830/001B of 04/09/2014

Awarded to

JINDAL FITTINGS LIMITED
A subsidiary of Jindal Saw Ltd

HEAD OFFICE:
28, Shivaji Marg, New Delhi – 110015, INDIA

AND PRODUCTION PLANT:
PLOT NO: B-13, MIDC Tembhurni Taluka – Madha, District: Solapur Maharashtra – 413211, INDIA

The Applied Coatings have been evaluated and found in conformity against the requirements of the following standards:

ISO 4179:2005

Ductile iron pipes and fittings for pressure and non-pressure pipelines – Cement mortar lining

ISO 8179–2:1995

External zinc coating -- Part 2: Zinc rich paint with finishing layer of Bituminous product/synthetic resin/epoxy

EN 14901:2006

Epoxy coating (Fusion bonded powder or liquid two-pack) of ductile iron fittings and accessories

ISO 16132:2004

Ductile iron Pipes and fittings - Seal Coat for Cement mortar lining

Data: 04/09/2014

Certificato N°: **830/001B**

Bureau Veritas Italia S.p.A. – Via Miramare, 15 – 20136, Milano

CERTIFICATE OF CONFORMITY

ISSUED TO

JINDAL FITTINGS LIMITED

DATE 20-05-2014

Awarded to	: M/s. Jindal Fittings Limited Plot No : B-13, MIDC Tembhurni Madha –Taluka, Solapur –Distt., Maharastra, India.
Type(s) of product	**: Ductile Iron fittings & accessories as per ISO 2531 , BSEN 545, BSEN 598**
Size	: DN 80 to DN1000
Pressure Rating	: PN 10, PN 16, PN 25 and PN 40
Specification and drawings.	**: AS** per ISO 2531, BSEN 545, BS EN 598.
Period of Audit and Testing	: 08.05.2014 to 15.05.2014

Detail of Audit conducted

1. Verification of manufacturing facilities
2. Verification of testing facilities.
3. Verification of Quality management systems
4. Verification of technical skill.
5. Incoming raw material control.
6. Witness of production process.
7. Testing of finished products.
8. Performance testing of joints.

We here by certify that Jindal Fittings Ltd, Tembhurni, India-413211 is capable of manufacturing ductile iron fittings and accessories in accordance with ISO 2531, BSEN 545, BSEN 598. Also the products have been evaluated and found in conformity against the specification requirements of ISO 2531, BSEN 545, BSEN 598.

FOR BUREAU VERITAS (INDIA) PVT. LTD

PROJECT MANAGER

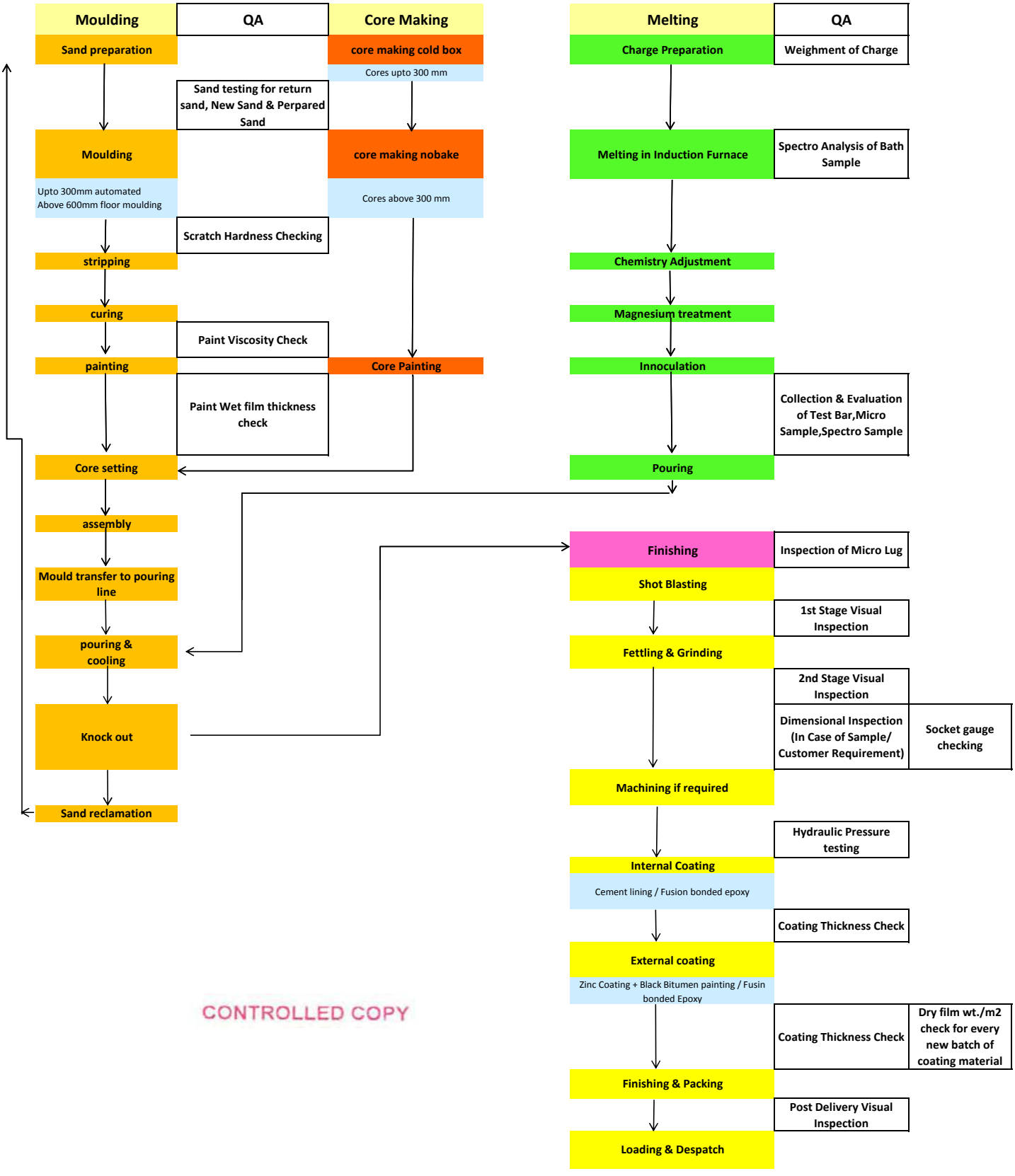
Bureau Veritas (India) Private Limited
214, Golden Arcade, Plot No. 141/142, Sector 8
Oslo Road, Gandhidham 370201, Dist. Kutchch
Tel. : + 91 2836 235721 • Fax : + 91 2836 230721
bv.kandla@in.bureauveritas.com

Regd. Off. : Marwah Centre
6th Floor, Krishanlal Marwah Marg
Andheri (East), Mumbai - 400 072
Tel. : 91 22 66956300 • Fax : 91 22 66956303
www.bureauveritas.co.in

Branch Offices at : Ahmedabad
Bangalore, Baroda, Chennai, Goa
Hyderabad, Jaipur, Kochi, Kolkata
Ludhiana, Nashik, New Delhi, Pune
Surat & Visakhapatnam

PROCESS FLOW CHART

PROCESS FLOW CHART
JINDAL FITTINGS LIMITED



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QUALITY SYSTEM MANUAL

QUALITY MANUAL

This issue of Quality Manual is prepared based on the requirements of ISO 9001:2008.

Scope: ***Manufacturing and supply of Ductile Iron Fittings for Pipes used in water, waste water and sewerage application***

Corporate Office:
28, Najafgarh Road,
Near CTC Mall, Moti Nagar
New Delhi, India
Phone : +91 (11) 45021544
Fax : +91 (11)
Web : www.jindalsaw.com

Works:
B-13, MIDC Tembhurni Industrial Area
Taluka – Madha,
District – Solapur
Maharashtra, India

Issue No. 01
Revision No. 01
Document No. JFL/QM
Date: 10.05.2014

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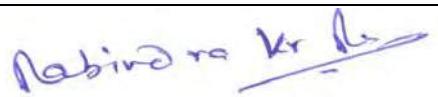
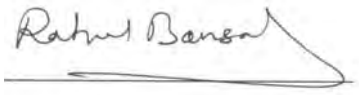
Prepared by	In-charge - QA	
Reviewed by	Management Representative	
Approved by	Executive Director	
Released by	Management Representative	

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REVISION STATUS SHEET

Section No.	Description	Rev. No.	Amended on
4.1	Machining is added as an outsource activity.	01	10.05.2014

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QUALITY POLICY

Jindal Fittings Ltd is committed to manufacture and supply the highest quality products and strives to be the best manufacturer of ductile iron fittings in the industry by good professional practices.

Jindal Fittings Ltd is committed to achieve the above by implementation of a system of documented procedures that provide guidance to our employees and reflect the competence of the company to serve existing customers, potential customers to their satisfaction.

Jindal Fittings Ltd is committed to operate and continually improve the products by effectiveness of the management system under the disciplines and control of a Quality Management System conforming to the International Standard IS0 9001:2008 as well as statutory and regulatory requirements.

All employees will share this commitment to quality, customer satisfaction and continual improvement.

Executive Director

Date: 01.02.2014

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INTRODUCTION

Jindal Fittings Ltd, a ductile iron fittings manufacturing unit in Tembhurni, Sholapur, Maharashtra, India is a subsidiary of Jindal SAW Ltd. which is the flagship company of the O.P. Jindal Group.

It is aim of the company to make recognition amid people's perception in terms of both product quality and service extents. The dominant multi-cultural work place at its diverse mix of personnel is the valuable assets and foremost strength of the company.

Jindal Fittings Ltd is inspired by the philosophy practiced by Jindal Group of Integrity and Fairness, Code of conduct, Transparency and Disclosure, Accountability and Responsibility, Shareholders'/Investors' Grievance Committee and Social Responsibility.

The ductile iron fittings manufacturing unit has state-of-the-art technology with size range from DN 80 to DN 2200 to cater the domestic and international market with an initial capacity of 18000 MT per Annum.

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1.0 Scope

Quality System as per ISO 9001: 2008 is established documented and maintained at JINDAL FITTINGS LTD. This quality system includes the following products, functions and locations.

1.1 Products

Manufacturing of Ductile Iron Fittings by No-bake & Green Sand molding Process.

1.2 Functions

(a) Marketing
(b) Production
(c) Quality Assurance & Control
(d) Maintenance
(e) Purchase
(f) Logistics / Dispatches
(g) Stores
(h) HR

1.3 Location

Jindal Fittings Ltd.
B-13, MIDC Tembhurni Industrial Area
Taluka – Madha,
District – Solapur
Maharashtra, India

1.4 Exclusion:

(a) Exclusion to clause refers no 7.3 [Design & Development Provision]

Design and Development provision does not apply to the activities currently carried out by JFL as the products are manufactured in accordance with customer requirements/ specifications such as IS 9532, BS EN 545, BS EN 598, ISO 2531 & ISO 7186. Should the company introduces this activity in future, the MR shall ensure that relevant policies and procedures are documented & implemented, (as per ISO 9001:2008).

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(b) Exclusion to clause refer no 7.5.4 [Customer's Property]

Customer's Property provision does not apply to the activities currently carried out by JFL as the products are manufactured in accordance with customer requirements/ specifications. Should the company introduces this activity in future, the MR shall ensure that relevant policies and procedures are documented & implemented, (as per ISO-9001-2008).

1.5 Statutory & Regulatory requirement. :

JFL follows statutory and regulatory requirements for its products & applies IS 9523, ISO: 2531/1998 (Thickness class fittings *), BS EN: 545/2006 (Thickness class fittings*), ISO 7186/1996 (Thickness class fittings*) and BS EN: 598/2002 (Thickness class fittings*), ISO: 2531/2009 (Pressure class fittings*), BS EN: 545/2010 (Pressure class fittings*), ISO 7186/2011 (Pressure class fittings*) and BS EN: 598/2007 (Pressure class fittings*).

Any revisions and amendments to these standards will be followed by JFL.

* Customer requirements may require the use of thickness class or pressure class Fittings.

2.0 Normative References

This quality manual defines the policies and principles applied against each of the requirements of ISO 9001:2008 and relates to all activities carried out in the company that determine quality, and lays down guidelines within which the company can operate.
Each section of the manual is related to an identified element of ISO 9001:2008.

Distribution

The ISO 9000 Management Representative (MR) is responsible for the controlled internal distribution of this manual, and changes thereto.

Uncontrolled Manuals

Any uncontrolled hard copy manuals are up-to-date at the time of issue and are only issued to outside organizations, customers etc. Such uncontrolled manuals will be clearly marked "For information only, not subject to automatic update".

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3.0 Terms and Definitions

Item	Definition
Acceptance Criteria	Defined limits placed on characteristics of materials, products or services
Customer	Organization or person that receives a product.
Calibration	Comparison and adjustment to a standard of known accuracy.
Control Features	A documented method to perform an activity to ensure conformance with specified requirements.
Controlled Document	Any document which has a unique no. or other identification, issue no., issue date and is stamped "CONTROLLED" in red ink.
Concession/ Waiver	Written authorization to use or release a quantity of material, components or stores already produced but which do not conform to the specified requirements.
Delivery	The point in time and physical location at which the agreed transfer of ownership takes place.
Design Acceptance Criteria	Defined limits placed on characteristics of materials, products or services established by the manufacturer to ensure conformance to the product design.
Documentation	Process of recording information.
Defects	The non-fulfillment of intended usage requirements.
Grade	An indicator of category or rank related to features or characteristics that cover different sets of needs for products or services intended for the same functional use.
Inspection	Activities such as measuring, examination, testing, gauging one or more characteristics of a product or services and comparing these with specified requirements to determine conformity.
Manufacturer	An applicant who makes or process products.
Manufacturing Acceptance Criteria	Defined limits placed on characteristics of materials, products and services established by the manufacturer to ensure conformance to the manufacturing requirements.
Non-conformity	The non-fulfillment of specified requirements. Any non-fulfillment of or deviation from specified requirements.
Process	A set inter-related resources and activities which transform inputs into output.
Product	Result of activities or processes.

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Item	*Definition*
Product Permit/ Deviation Permit	Written authorization, prior to production or before provision of a service to depart from specified requirements for a specified quantity or for a specified time.
Product Liability	Service liability, A generic term used to describe the onus on a producer or others to make restitution for loss related to personal injury, property damage or other harm caused by a product or service.
Quality	The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs. Conformance to specified requirements.
Quality Loop	Quality spiral conceptual model of interacting activities that influence the quality of a product or service in the various stages ranging from the identification of needs to the assessment of whether these needs have been satisfied.
Quality Policy	The overall quality intentions & policy direction of organization as regards quality as formally expressed by the top management.
Quality Management	That aspect of the overall management function that determines and implements the quality policy.
Quality Assurance	All those planned and systematic action necessary to provide adequate confidence that a product or service will satisfy given requirements for quality.
Quality Control	The operational techniques & activities that are used to fulfill requirements for quality.
Quality System	The organizational structure responsibilities, procedures, processes & resources for implementing quality management. The organizational structure, responsibilities, control features and resources needed to manage quality.
Quality Plan	A document setting out the specific quality practices, resources and sequence of activities relevant to a particular product, services, contract or project.
Quality Audit	A systematic and independent audit examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.
Quality Surveillance	The continuing monitoring and verification of the status or procedures, methods, condition processes, products and services and analysis of records in relation to stated reference to ensure that specified requirements for quality are being met.
Quality Management Review	A formal evaluation by top management of the status and adequacy of the quality system interrelation to quality policy and new objectives resulting from changing circumstances.
Reliability	The ability of an item to perform a required function under stated conditions for a stated period of time.

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Item	*Definition*
Specification	The document that prescribes the requirements with which the product or services has to conform.
Special Process	Process, the result of which cannot be fully verified by subsequent inspection and testing of product
Supplier	Any individual or company that provides materials, products or services to the manufacturer.
Organization / Company	The organization that provides a product to the customer. (Jindal Fittings Ltd.)
Traceability	The ability to trace the history, application or location of an item or activity or similar items or activities by means of recorded identification.
Verification	Conformation through the provision of objective the specified requirements have been fulfilled.
Continual Improvement	Recurring activity to increase the ability to fulfill requirement.
Corrective Action	Action to eliminate the cause of nonconformity or other undesirable situation
Preventive Action	Action to eliminate the cause of a detected potential nonconformity or other undesirable potential situation

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4.0 Quality Management System

4.1 General Requirements

This section outlines the Quality Management System of **Jindal Fittings Ltd**, which has been established, documented and implemented as per the requirements of ISO 9001: 2008. JINDAL FITTINGS LTD. has identified various process needs for Quality Manual & their application throughout the organization.

(a) The detailed processes and their application are identified in **Annexure – 1.**

(b) The sequence and interaction of these processes is given in **Annexure – 2** and **3**.

(c) The criteria and methods needed to ensure the effective operation and control of processes have been identified and documented in Quality Assurance Plans (QAP), Standard Operating Procedures and Work Instructions.

(d) Management ensures the availability of resources in terms of manpower, training, equipment and financial supports. The information necessary to support the operation and monitoring of these processes are provided through documented Work Instructions.

(e) These processes are measured, monitored & analyzed and actions, necessary to achieve planned results, are initiated.

(f) The necessary actions are initiated for continual improvement of these processes.

Following activities are outsourced

- Transportation
- TPI Services
- Calibration
- Machining

Controls are established as below:

Transportation-Job order shall be made as per our requirement. Capacity of vehicle Physical properties of the material to be transported Risk involvement etc. shall be mentioned in the job order & control is established.

TPI Services-Expertise of services provider. Relevant certifications possessed by service provider whether it is government approved or not is checked.

Calibration-Calibration work of instruments (where applicable) shall be done by NABL accredited laboratories only. Calibration source of standard shall be conformed and control is established.

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Machining- Work order shall be made as per requirement. Received material will be checked and verified for dimensional requirement.

4.2 Documentation Requirements

4.2.1 General Requirements

The quality management system documentation has been developed, written, issued, installed and maintained includes the following:

a) **Quality Policy and Quality Objectives.** The quality objectives are customer focused. It is also aimed at enhancing customer satisfaction. The performance of processes is continually improved by **Plan – Do – Check – Act (PDCA Cycle).**

Plan : It is to establish the objectives and processes necessary to deliver result.

Do : Implement the identified processes.

Check : Monitor and measure the processes and product against plan and report results.

Act : Take action to continually improve process performance.

b) **Quality Manual**

c) **Standard Operating Procedures and Work Instructions** to ensure effective planning, operation and control of its processes. The system procedures make reference to the Work Instructions, Formats and Records, wherever necessary. List of Procedures and Work Instructions are given in **Annexure – 5.**

d) Documents of external origin like International Standards and other records as intended by **IS 9523**, **ISO: 9001**, **ISO: 2531, ISO: 7186, BS EN: 545, BS EN: 598.**

4.2.2 Quality Manual

JINDAL FITTINGS LTD. has documented its Quality Manual as per the requirement of international standard ISO 9001:2008. This Quality Manual has been prepared by Management Representative of the Company and is approved by the Executive Director. It covers the scope of quality management system, including details of exclusions, if any. It incorporates all the activities performed & verified during production and verification stages giving details of interaction between these processes. It also contains cross reference of operating procedures. The Quality Manual is prepared with four levels of documents:

Level 1 : **Quality Manual**
Level 2 : **Standard Operating Procedures**
Level 3 : **Work Instructions**
Level 4 : **Reports, formats and other records.**

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4.2.3 Control of Documents

Documents required by quality management system are controlled to ensure that all pertinent issues of appropriate document and data are available at location where, operation essential to the effective functioning of quality system are performed.

Documented procedures have been developed and maintained to provide the necessary controls to

a) All documents have to ensure/check that they are correct before approve and issue. MR shall be responsible for controlled distribution of Quality Manual, controlled distribution of standard operating procedures, work instructions and relevant standards and codes etc.

Quality Manual shall be prepared and updated by Incharge QA reviewed by MR, and approved by the Executive Director.

Standard Operating Procedures shall be prepared and updated by respective head / Incharge of department / section, reviewed by MR and shall be approved by General Manager.

All the work instructions shall be prepared by respective sectional heads, reviewed by departmental heads and approved by MR.

b) All the changes in the control documents shall be reviewed and approved by the same authorities who performed the original review / approval and the revised area shall be highlighted by a side line. The content of the page in the manual shall indicate section and revision no. of each section, mentioning references of relevant clauses. Each page of manual shall indicate page no. First page contains approval date and approving authority.

The quality manual shall be numbered as JFL/QM and shall be stamped for Copy No.

c) National and International Standards, customer supplied drawings, equipment drawings, operation and maintenance manuals are considered as documents of external origin.

d) Ensure the relevant versions of the appropriate documents are available at the points of use.

e) Ensure the documents remain legible and readily identifiable.

f) Ensure that appropriate documents of external origin are identified and their distribution controlled.

g) Prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any specific purpose.

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Reference Documents:

Procedure for Control of Documents: JFL/SP/01

4.2.4 Control of Records

The control of records provide for identifications, collection, indexing, filling, access, storage, maintenance and disposition. Records are maintained to demonstrate achievement of the required quality & the effectiveness of the quality system.

MR Control the records pertaining to the quality system. These records are indispensable for the effectiveness of the quality system. Following quality records are maintained by MR.

- Minutes of management review.
- Internal quality audit reports.
- Corrective & preventive action reports related to quality system.
- Issue records of quality manual.
- Records of field non-conformance.

Quality records are in the form of either hard copy or soft copy as per the feasibility. The records of the internal and external audits, internal test certificates, customer complaints shall be retained for a period of **five (5) years.** Retention period of all other quality records shall be defined in the concerned functional list of records.

Pertinent quality records are made available to the customer, if required contractually.

It is ensured by all HOD's that the records are legible & identifiable to the product and are readily retrievable.

A list of quality records maintained by the respective HOD's & the methods are defined in procedure for control of records.

Reference Documents:
Procedure for control of records: JFL/SP/02

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5.0 Management Responsibility

5.1 Management Commitment

Management of JINDAL FITTINGS LTD. is committed for the development and implementation of Quality Management System and continually improving its effectiveness by:

a) Communicating throughout the organization by means of mails, notice boards, briefings, and departmental meetings about the importance of meeting customer requirements, whilst also meeting statutory and regulatory requirements.

b) Documenting and communicating the quality policy.

c) Firmly resolving that the established quality objectives must be achieved within the stipulated time frame.

d) Conducting Management Review Meetings.

e) Providing adequate resources to all functional heads, which will enable them to achieve the desired standards.

5.2 Customer Focus

The management ensures that the customer focus is maintained by understanding the market conditions and requirements, present & future customer needs stated as well as implied needs, which are understood properly & they are fulfilled with the aim of enhancing customer satisfaction related to scope of customer contract/ purchase order.

Statement of customer orders is accepted for review & execution.

Any amendments to the contract are correctly & timely communicated to concerned functional heads by the marketing departments. Records of amendment are properly maintained.

Customer feedback is taken to ensure that the products meet customer satisfaction and any suggestion from customer are discussed and incorporated to ensure continual improvement.

Reference Documents:

Procedure for Contract Review: JFL/SP/09

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5.3 Quality Policy

ED is responsible for the quality policy. It is ensured that the quality policy:

- Is relevant to the purpose of the organization.
- Has a commitment to comply with requirements and continually improve the effectiveness of the quality management system.
- Promotion to establish and review quality objectives.
- Is communicated & understood within the organization.
- Is reviewed for continuing suitability

5.4 Planning

5.4.1 Quality Objectives

The management ensures that Quality objectives at relevant functions and levels within the organization including those needed to meet requirements for product are adequately established. These objectives are consistent with the Quality Policy and lead to continual improvement. These objectives are constantly reviewed.

- To achieve zero field non - conformances.
- To deliver the product as per schedule.
- To optimize the available resources.
- To improve the customer satisfaction level.
- To identify and adopt better practices leading to achieve target defect levels.

5.4.2 Quality Management System Planning

The management has ensured that

(a) Planning of the quality management system is carried out in order to meet the general specific requirements of ISO 9001:2008 including the need for continual improvement, establishing and meeting the quality objectives

(b) The integrity of the quality management system is maintained through control of documents, when changes to the quality management system are planned and implemented.

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5.5 Responsibility, Authority and Communication

5.5.1 Responsibility and Authority

In the organization, functions and their interrelation and also the responsibility and authority are defined and communicated to all concerned for effective quality management. Functional heads that manage, perform and verify work affecting quality, at various levels have generic responsibility & authority within their defined areas of control as described below:

- Initiate action to prevent the happening of any non-conformity of the product, procedure or quality system.
- Locate and record any problem of the product, procedure and quality system.
- Check the effectiveness of solution.
- Control further action on the non-conforming product / procedure till the deficiency has been corrected.

Responsibility of Key personnel is defined as here under – **Enclosure - 4**:-

Executive Director

- Responsible to achieve company's strategic objectives and provide leadership and directions staff.
- Manage overall company operations.
- Ensure that resources are available to achieve company's objectives.
- Assigns Roles and functions to senior management & Manage, motivate, develop and lead members of management team.
- Framing quality policy.
- Appoint Management Representative.
- Approve the Quality Manual.
- Ensure adequate resources for effective implementation and maintenance of Quality Management System.
- Conduct Management review meetings.
- Establish and develop the company's culture and values.
- Ensure that there is a fit between strategy and culture and company's processes and structure.
- Ensure the implementation of cost reduction plans to be prepared and implemented.

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General Manager

- Ensure overall performance of fitting manufacturing facility.
- Direct all manufacturing activities of Ductile Iron Fitting facility.
- Establish and monitor the performance goals and allocate resources to the managers.
- Responsible for coordinating modifications / developments / augmentation of plant machinery.
- Identification and arranging of required resources in time and optimal utilization thereof.
- Planning of production based on order execution plan received from Marketing or OEC (Corporate), based on available resources.
- Keep the check on Raw Materials and production consumable planning and monitoring.
- Monitoring and reviewing of production on day-to-day basis.
- Monitoring for timely production and meeting delivery requirements
- Address specific and urgent requirements during order / project execution

Head - Quality

- Ensure all the company's products and services meet and exceed the customers' expectations.
- Defining the quality objectives for all functions and achieves the stated requirements of quality policy.
- Implement quality program throughout the organization.
- Implement and monitor quality improvement in products and services & quality performance measures.
- Authorize to accept the materials with deviation, which does not have impact on the quality of the product.
- Closing of quality related complaints.
- To analyze field non-conformances/customer complaints and to decide and implement corrective/preventive actions.
- To maintain and demonstrate the performance criteria required by national international and customer requirements / specification
- To establish a product display area illustrating the complete product range.

Incharge (QC)

- Acceptance of finished DI fittings.
- In process inspection at various stages.
- Review of all inspection documents, verifies that all necessary tests are completed satisfactorily and authorizes for dispatch.
- Preparation of trend analysis for all key quality parameters.
- Inspection of the products with third Party Inspection agency / customers as per customer requirements by third party in-charge.
- Coordinating of customer complaints

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Incharge (QA)

- Preparation and issue of Quality System Manual and its revisions.
- Implementation of procedures, practices and systems.
- Trend analysis and reporting to top management.
- Surveillance of approved Quality Management System.
- Arranging internal quality audits.
- Controlling the distribution of procedures, work instructions and other quality documents, drawing related product quality.
- Reporting non-conformances to the Head-Quality and the respective departments. Decides the corrective action and verifies for its implementation.
- Overall calibration of equipment and instruments in plant related to product and process quality.
- Necessary certification of raw materials and product.
- Review of non-conforming products.
- Control all function of Laboratory function.

Manager -Production

- Responsible for manufacturing of DI fittings which includes Melting operation, Moulding Operation, Casting operation, Fettling Operation and Finishing Operation.
- Planning for Raw Material requirements.
- Responsible for coordinating corrective and preventive actions connected to plant operation, maintenance.
- Responsible for controlling the rejections.
- Responsible for optimum utilization of resources including control of raw material consumption along with safety of all resources.

Manager -Pattern Shop

- Responsible for New pattern design & development, establish and approve the technical specification and scope for pattern procurement.
- Responsible for planning and maintenance of pattern shop activity.
- Responsible for coordinating corrective and preventive actions connected to pattern and maintenance of pattern and modification.
- Responsible for controlling the rejections pertain to Pattern and methoding.
- Responsible for optimum utilization of resources.

Head - Maintenance – Electrical

- Overall maintenance activities of Plant, machinery and equipment in electrical maintenance activities.
- Planning, Follow up and execution for annual electrical maintenance contracts.
- Identification of electrical and electronic spares requirement for plant and machinery.
- Planning for electrical preventive maintenance of plant and machinery.
- Implementing corrective and preventive actions connected to electrical and electronic plant maintenance.
- Providing electrical and electronic specialist maintenance services.

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Head - Maintenance – Mechanical

- Overall maintenance activities of Plant, machinery and equipment in Mechanical maintenance activities.
- Planning, Follow up and execution for annual mechanical maintenance contracts.
- Identification of spares requirement for plant and machinery pertain to Mechanical and Hydraulics.
- Planning for preventive maintenance of plant and machinery pertain to Mechanical and Hydraulics.
- Overall operation and maintenance activities for offsite maintenance and other services.
- Water management, air management and fuel management.
- Implementing corrective and preventive actions connected to plant mechanical maintenance.
- Providing any specialist mechanical maintenance services.

Head-Marketing

- Marketing and promotion of DI fittings globally by delivering seminars and technical presentation to consultants / contractors / water bodies.
- Discussing tenders and projects with the QA / operations / finance team before bidding in coordination with JSAW Pipe Marketing (Corporate office).
- Ensuring that all order documents are in line with agreed terms.
- Arranging of all commercial resources from customers (finance, road permits etc.) to facilitate dispatch of material.
- Submitting supply documents to the respective customers in coordination with Plant.
- Ensuring timely payments from customers.
- Handling Customer's complaint in consultation with technical / Quality team.

Head - Stores

- Receiving, coordinating for inspection and storage of all materials.
- Proper storage of raw materials, consumable, spares at the designated place.
- Maintaining inventories of all Min – Max specified Items.
- Ensure minimum stock level of raw materials and spares in consultation with concerned heads.
- Condition and monitoring of shelf life and other stored items.
- Monitoring and taking appropriate actions for non-moving and slow moving items.
- Inventory management and physical verification.
- Control the movement of inbound and outbound materials.

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Head-Logistics / Dispatch

- Planning and arranging cost effective shipments of raw material and finished products
- Co-ordinate with Marketing and Plant for timely delivery and movement of goods after production
- Ensure the timely arrival of raw material at production facility.
- Submission of documents to customs clearance for Export/Import.
- Claiming duties and export benefit as applicable.
- Proper storage of finished goods.

Head -Finance & Accounts

- Arrange finance and improve cash flow for business of company.
- Implement and monitor payment authority practices.
- Manage financial systems.
- Conduct financial analysis, prepare financial reports and statements.
- Ensure Statutory & Legal compliance under Various Acts & Rules
- Dealing with External Agencies like Statutory Auditors, Banks, Govt Deptts.
- Preparation & Maintenance of BOA & ensuring the accuracy
- Establish and maintain cash control.
- Ensure company accounts are dealt in a professional manner.
- Preparation & Presentation of Books of Accounts on Monthly basis
- Preparation of monthly product costing and circulating the same to the management.
- Submission of invoices along with all necessary documents to bank/customers.
- Arrange Certificate of origin for Export orders / client requirement and its attestation etc.

Head-Purchase

- Purchase of raw-material, consumables, spares and project related items from suppliers as indented
- Ensure purchase orders contain necessary data / clauses / technical notes and verification before placing purchase order.
- Identifying and selecting suppliers for specific requirement of customers.
- Vendor Evaluation for key item suppliers.
- Maintain optimum level of inventories for smooth functioning
- To understand the material specification requirements of various materials and educate the supplier for producing desired material quality.

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Head- HR & Admin

- Ensuring recruitments are done in time and per requirement and employment is processed as per law.
- Arranging in-house and external training to the personnel performing work affecting quality of all the departments at works.
- Monitoring the effectiveness of training provided.
- Ensuring all labor laws, legal requirements are enforced.
- Ensure all legal documentation relating to government laws are met.
- Ensure suitable training program is established in line with company need.
- Ensure any external training is arranged on regular basis.

Manager -HSE

- Overall in charge for all environmental and safety related activities
- Co-coordinating with the legislative authorities on all the environmental matters.
- Ensure compliance with the applicable legal and other relevant requirements relating to its Management of Environment, Occupational Health and Safety issues
- Controlling incidents and accidents in its operations and safeguard all employees, clients and general public and continually striving to achieve the zero accident level.
- Motivating all employees to take personal responsibility in protecting the working environment and creating safer and healthier workplace.
- Ensuring all employees are properly trained for appropriate usage of equipment and efficient use of material and energy
- Monitoring and preventing pollution, Reusing and recycling of materials to encourage cost effective opportunities. Handling and disposal of waste materials in ways that minimize environmental risk and comply with EHS legislation.
- Supervision of HSE in all locations in plant
- Ensure that all SOPs are followed.
- Incident reporting and risk assessment

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5.5.2 Management Representative

Executive Director has appointed Head - Quality as Management Representative with the responsibility to establish, implement and maintain the processes needed for Quality Management System in accordance with ISO:9001 – 2008.

MR has the direct responsibility for:

- Review and issue of Quality Manual.
- Reporting to top management on the performance of the Quality Management System and need for improvement.
- To organize for management review of quality performance.
- Control of quality records related to management review and quality audits (internal & external).
- Responsible for implementation of quality policy and for evaluating the suitability of the quality assurance program.
- Planning & organizing the internal quality audits.
- Verification of corrective action on a non -conformity and its closure.
- Ensuring the promotion of awareness of customer's requirements throughout the organization.

5.5.3 Internal Communication

Appropriate communication process regarding Quality Management System and its effectiveness, are established within the organization. Management ensures that communication regarding effectiveness of quality management system take place as required from time to time. QMS and its changes are communicated to company personnel by distributing hard copies of QMS to concerned HOD's. The concerned internal auditor communicates internal audit finding to the auditee. Findings of external audits are communicated to the auditee by external auditors / MR.

5.6 Management Review

Management review of the quality system takes place half yearly to ensure its continuing suitability, adequacy & effectiveness. The review covers the evaluation of the need for changes to the system, quality policy and quality objectives.

Executive Director shall be responsible for the management review of the quality system.

The management review shall be conducted by Executive Director and all HOD's along with MR shall attend the review.

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The input for these reviews shall be:

- Results of internal & external audits.
- Review of customer's feedback / complaint.
- Process and Product conformance.
- Effectiveness of quality management system.
- Status of Preventive and Corrective action.
- Follow up action of previous management reviews
- Changes that could affect quality management system.
- Recommendation for improvement.
- Trend analysis
- Any other related issues.

Executive Director after review of the various issues affecting the quality finalizes the improvement action plan, assigns the responsibilities, identifies & provides the resources required and defines the implementation monitoring, controlling & follow – up mechanism.

The output from these reviews shall be the decisions or actions to:

- Improvement of the effectiveness of Quality Management System and its processes through corrective and preventive actions arising out of Management Review Meeting.

- Improvement of Product related to customer requirements.

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6.0 Resource Management

6.1 Provision of Resources

JFL shall determine and provide the resources needed to:

(a) Implement, maintain and improve the quality management system and continually improve its effectiveness and

(b) Enhance customer satisfaction by meeting the customer's requirements.
Resources include plant and associated equipment, trained personnel, process control instruments. This shall be done through Management Review Meeting.

6.2 Human Resources

6.2.1 General

Manpower with minimum pre-defined qualification is provided for all the activities affecting quality.

Head (HR) ensures that the human resources are duly trained & competent to perform the required activity. Head (HR) also ensures that the competence of a person is measured after a particular training imparted to him on particular skill set.

All records of training shall be maintained as per procedure no. JFL/SP/ 06

6.2.2 Competence, awareness and training

Training needs of all personnel performing activities affecting quality are identified and provided. Personal performing specific tasks are qualified on the basis of appropriate education, training and/or experience. Human Resource & concerned Manager shall ensure the control on this activity.

All the personnel in the organization receive training related to QMS and the quality policy. Such training is a part of induction process.

Training needs of personnel are identified based on the following:

- Corrective & preventive action
- Results of internal quality audits.
- Changes in working procedures, QMS & product requirements.
- Induction of new employee.
- Through annual appraisals.

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The effectiveness of the training imparted shall be evaluated.

Qualification criteria for personnel performing quality related activities are defined. The records are maintained by Head (HR).

Reference Documents:

Procedure for Training & Qualification Requirements: JFL/SP/06

6.3 Infrastructure

The management also determines, provides and maintains the requisite infrastructure for achieving conformity of product. This includes:-

a) Building, workspace and associated utilities.

b) Process equipment, hardware and software.

c) Suitable handling facilities.

d) Suitable trained personnel (including qualified & trained personnel from outside sources) if required & procedure are provided.

e) Information system with suitable facilities.

Personnel assigned to various tasks are suitably qualified with formal training and / or experience, especially for following activities:-

- Inspection / testing & monitoring of process.
- Test Methods.
- System procedures.
- Product Specification.
- Internal audits for quality system.

Adequacy of these resources is reviewed during:

- Management review
- Contract review

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6.4 Work Environment

The process that directly affects the quality is defined and it is ensured that these processes are carried out under controlled condition and the required working environment for performing the required task is provided. All departmental Managers are responsible for providing suitable working environment in their respective area.

Process equipment& utility equipment used for production are maintained in proper working conditions & preventive maintenance at defined intervals is carried out on identified equipment.

Proper housekeeping is maintained to provide conducive working environment to the employees. For this, all the equipment & their parts are maintained in safe & clean condition. All the spares & tooling are kept in an identified area in good condition. The shop floor is clean and free of oil & other foreign material. The walkways are properly identified & marked.

Enough lighting is provided for good illumination on the shop floor. In sound polluted area ear plugs are provided to employees.

All the employees shall wear the required personnel protective equipment.

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7.0 Product Realization

7.1 Planning of Product Realization

JFL has developed and implemented procedures and provided the necessary resources, for all the processes to ensure the successful realization of the product to conform to the specified requirements, in the following manner:

- Requirements of Contract Review for Product are furnished by Head – Marketing to General Manager / Head – Quality.
- Quality parameters for product and quality control are determined by General Manager / Head Quality.
- General Manager shall establish the manufacturing processes specific to the product, if any, and provides necessary resources.
- Head-Quality shall determine the required verification, monitoring, inspection and testing activities specific to the product and the acceptance criteria.
- Head-Quality and Manager – Production shall ensure appropriate records to provide evidence for products meeting the specified requirements.
- Head Maintenances shall ensure the overall maintenance of the plant and equipment.
- Each functional head is responsible for training of the personnel working under them.

Reference Documents:

Procedure for Contract Review: JFL/SP/09
Procedure for Handling Storage and Shipping: JFL /SP/11
Procedure for Non-conforming Products: JFL /SP/04
Procedure for Corrective and Preventive Action: JFL /SP/05
Quality Assurance Plan: JFL/QAP/9523, 2531, 545, 598 & 7186
Goods receipt note
Inspection and Test Certificates

7.2 Customer Related Process

Head-Marketing is responsible to ensure that customer's requirements are understood and complete information is obtained from customers.

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7.2.1 Determination of Requirements related to Product

(a) Head-Marketing shall determine all customer requirements, with clear technical specifications and including any specific requirements for delivery.

(b) Head-Marketing shall also consider requirements not stated by the customer but may be necessary for specified or intended use.

(c) Head-Marketing shall determine any additional requirements that may enhance the product serviceability and stands warranty for it.

7.2.2 Review of requirements related to Product

Head Marketing shall review the requirements related to the product. This review shall be conducted prior to JFL commitment to supply the product and shall ensure that:

(a) Product requirements and technical specifications are adequately defined and conform to project requirements.

(b) Proper class of fittings, jointing system and outside coatings and inside linings are defined as per the project requirements.

Head –Marketing shall review the requirements related to the product and obtain the confirmation on capability to manufacture and delivery commitments from Plant. This review shall be conducted prior to JSL commitment to supply the product and submission of offer to the customer.

Head-Marketing in close interaction with General Manager / Head-Quality, after receipt of purchase order shall ensure that

(a) Any differences or inconsistency noticed in the purchase order with reference to our offer in the form of offer/tender, the same shall be resolved by interacting with the respective customer by Marketing Head.

(b) After resolving the differences, if any, contract review should be recorded and order acceptance to be issued to the customer.

(c) Where the customer provides no documented statement of requirement, the customer requirements shall be confirmed and documented internally by Head Marketing and forwarded to General Manager who reviews the same in consultation with Head-Quality before order acceptance.

(d) Where any product requirements are changed, Head Marketing shall ensure that relevant documents are amended and circulated to all the concerned personnel. The record of the results of such review shall be maintained by Head-Marketing.

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7.2.3 Customer Communication

The company has made adequate arrangement to communicate product information enquires, order handling, customer feedback & customer complaints to the customer.

During the contract execution, Marketing department shall co-ordinate with Customer, Works, Finance and Purchase for smooth execution of order.

The marketing department shall co-ordinate the contract execution and completion of all contractual obligations.

Reference documents:

Procedure for Contract Review **:** JFL/SP/09

7.3 Design and Development

This clause is not covered under this Quality Management System.

7.4 Purchasing

7.4.1 Purchasing Process

Head Purchase shall ensure that purchased items conform to specified purchase requirements. The type and extent of control applied to the supplier and the purchased items will be dependent upon the effect of the purchased items, materials on subsequent final product provided to the customer.

Head Purchase shall select suppliers based on their ability to supply products. The criterion for selection is detailed in procedure for purchasing. The suppliers are evaluated at the time of approving them as suppliers. The selected suppliers are evaluated in every six months.

The purchases are defined under three major categories:

a) Raw Material for Fitting Manufacturing Facility.

b) Non raw material and project related Purchases.

c) Maintenance spares, production consumables and other miscellaneous purchases.

Purchase department maintains approved suppliers list and also records of evaluation and re-evaluation of listed approved suppliers.

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7.4.2 Information required for Purchasing

Purchase order shall contain necessary description of quality requirements, enclosure of separate specification (if necessary) and quantity and delivery requirements.

The packing and any other special requirements as necessary should also be mentioned.

7.4.3 Verification of Purchased Product

JFL have established and implemented inspection, testing, or other activities necessary to ensure that the purchased products meets the specified requirements.

a) Verification at Supplier's Premises, where required, the product may be verified at supplier premises by JFL, the same will be indicated in purchase orders.

b) Customer verification of supplier product

Where such verification is a specified requirement, customer or his representative is allowed to verify the product at supplier's premises. In those cases, JINDAL FITTINGS LTD shall state the intended verification arrangements and method of release of inspected product in purchase order.

Reference Document:

Procedure for Purchase : JFL/SP/08
Procedure for receiving inspection : JFL/SP/14

7.5 Provision for Production

7.5.1 Control of production and service provision

The company has established the system to ensure that production process, which directly affect the quality is identified & it is ensured that these production processes are carried out under controlled condition. The entire production processes affecting the quality should be easily identifiable & traceable.

(a) Information regarding the product characteristics is made available by Head-Marketing to the General Manager and Head – Quality.

(b) Incharge- QA shall prepare the Quality Assurance Plan (QAP) containing all the requirements of specifications, having reference of National and International Standards and the stages of quality checks including hydro testing. QAP also contains the information about the acceptance criteria and the inspection and testing procedures or reference standards.

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(c) The criteria, methods and work practices have been defined in the Standard Operating Procedures and Work instructions, which are documented and issued to the concerned personnel.

(d) Preventive maintenance schedules are prepared and executed to make the equipment available for continuous operation by respective Heads (Maintenance) for their respective departments.

(e) The necessary monitoring and measuring devices have been provided at appropriate locations to meet the requirements as specified in Quality Assurance Plan**.**

(f) Incharge - QC releases the D.I. Fittings for delivery to customer after verification from the records and inspection reports.

Reference Documents:

Standard Operating Procedure	:	JFL/SP/01 to 20
Work Instructions	:	JFL /WI/01 to 27
Quality Assurance Plan	:	JFL/QAP/9523, 2531, 545, 598 & 7186
Weekly/Monthly production plan		

7.5.2 Validation of Processes for Production and Service Provision

No validation required for JFL special processes:

7.5.3 Identification and Traceability

JFL has established a system to ensure that incoming material / product is suitably identified on receipt.

(a) Traceability and Identification of Raw Materials

All raw materials received shall be identified.

The inspection and the test status of the incoming raw materials are identified by any one or more of the following methods:

(i) By Display board
(ii) Designated physical location
(iii) Tags
(iv) Markings

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(b) Traceability and Identification of Liquid Metal, Ductile Iron Fittings

(i) Hot Metal from each Induction Furnace shall have individual Heat no. / Treatment no.

(ii) Individual fittings shall be identified and traceable back to metal heat number.

(iii) The Hot Metal log sheets are maintained by melting section.

(iv) Fittings from each casting moulds shall have individual *fitting no*. having reference of mould no. and the casting date. The traceability will be maintained right from the casting day to the finished product.

(v) The inspection status of DI Fittings is known by location/by markings/from records.

(vi) The procedures are established and documented to ensure that products that have passed the required inspection and tests only are dispatched.

(vii) The traceability requirements specified by customer and /or as per JINDAL FITTINGS LTD requirements shall be maintained.

(c) Moulds/Core Boxes are identified by location, appropriate markings or by display boards.

Reference Documents:

Procedure for Identification and Traceability: JFL/SP/20

7.5.4 Customer's Property

This clause is not covered under this Quality Management System.

7.5.5 Preservation of Product

This section covers the responsibility, system and procedures for handling, storage, packaging, preservation & delivery of product to ensure that the product/materials are properly received, stored, handled, packed, marked, preserved and delivered to meet the customers' requirements.

Head - Stores and Head-Logistics shall be responsible for receipt, storage, handling preservation & delivery of materials under his custody i.e. raw material receipt, storage & handling, Stacking & storage of finished products and loading & dispatch of finished products.

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In order to maintain conformity of the product to requirements, the products are preserved during internal process.

a) Stores personnel shall identify, handling, storage and protection activities for all materials received and issued by stores. Their scope of activity covers till issue of materials to users. All materials / products are stored in secured areas to prevent damage or deterioration of quality of material / product.

b) Items with limited shelf life are periodically verified, for their suitability.

c) Operation personnel of different sections are responsible for identification, handling, storage of materials used for manufacturing activities and also in-process materials.

d) All Ductile Iron Fittings are handled with care to avoid damage /cracks during handling. Moulds and Core Boxes are identified, stored and handled to avoid damages/deterioration of quality.

e) Maintenance department is responsible for identification, handling and storage of spares and consumables used in maintenance department.

f) Production, Logistic & Dispatch department shall be responsible for ensuring necessary identification, handling, storage and transportation of finished products.

Reference Document :

Procedure for Handling, Storage and Shipping: JFL/SP/11

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7.6 Control of Monitoring and measuring Devices

JFL has established system to determine, control, calibrate and maintain monitoring and measuring devices needed to provide evidence of conformity of products to determined requirements.

(a) JFL shall establish processes to ensure that monitoring measurement are carried out in a manner that is consistent with monitoring and measurement requirements for Products.

(b) Monitoring and measuring devices are used for verification of processes and product characteristics, and are calibrated periodically and the status is identified.

(c) The measuring and monitoring devices are used in a manner, which ensures that the measurement uncertainty is known and is consistent with required measurement capability.

(d) If any monitoring and measuring device is not in use for a long period, it is calibrated / verified before use.

(e) Monitoring and measuring devises are calibrated using certified equipment /materials having known valid traceability to nationally recognized standards or in house established and documented procedures.

(f) Calibration has been carried out on measuring equipment which is adjusted/re-adjusted.

(g) In case the equipment is found to be out of calibration, In-charge QA shall assess through documents, the validity of previous inspection and test results and disposes off accordingly.

(h) The process employed for calibration is documented and followed.

(i) Suitable environmental conditions are provided for the calibration, inspection and tests as appropriate.

(j) Monitoring and measuring devices are identified to enable calibration status.

(k) Monitoring and measuring devices are handled, preserved and stored appropriately to prevent damage and deterioration.

(l) Monitoring and measuring devices are safeguarded as appropriate from adjustments, which would invalidate the calibration setting.

(m) Calibration records are maintained.

(n) Procedure for control of Inspection, measuring and test equipment, calibration method adopted are documented and records are maintained for the same.

Reference Documents:

Procedure for Calibration of Measuring and Monitoring Devices: JFL/SP/19

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8.0 Measurement, Analysis and Improvement

8.1 General

Measurement, Analysis and Improvement are the most important aspect for a business to run. Hence, the Management ensures the effective & efficient measurement, collection and validation of data in order to evaluate the organizational performance with respect to customer's satisfaction and continual improvement

Management continually monitors the various processes for its performance improvement actions. Few identified processes / area for such measurement and analysis are as mentioned below:

- Measurement and evaluation of product.
- Achievement of project specific objectives.
- Satisfaction of customer and other interested parties e.g. Employees.
- Capability of processes wherever applicable.

The result of the analysis of data from various improvement activities shall become one of the inputs for the Management Review, where overall performance of the organization is evaluated against the target / planned arrangement.

8.2 Monitoring and Measurement

8.2.1 Customer Satisfaction

The management monitors the information relating to customer satisfaction as one of the measurement of performance of the quality management system.

The management & monitoring of customer satisfaction is based on the review of the customer related information. The collection of such information may be active or passive. Management has identified the information related to the customer / end-user from internal & external sources.

The data from customers' feedback / satisfaction report is collected by Marketing in every six months**.** The information related with price, quality, delivery, logistic, documentation and the audit feedback of visiting clients are monitored as minimum information.

Besides, the customer's complaint, communication with the customer & reports from the media on various aspect related with the organization etc. is also considered for measuring the customer satisfaction / perception.

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The information gathered from individual clients are summarized and are reviewed for determining the overall customer satisfaction / perception level. An action plan is prepared based on the analysis of information by marketing and suitable corrective & preventive measures are initiated by Head (Marketing) to improve the satisfaction level.

Reference Documents:

Procedure for Contract Review: JFL/SP/09

8.2.2 Internal Audits

Internal quality audits are carried out as per audit schedule in order to verify whether quality objectives and related results comply with planned arrangements and to determine the effectiveness of the quality system

M.R. shall ensure that internal quality audits are conducted at least twice in a year with following audit plan:

- Audit schedule is prepared.
- Suitable audit team is selected.
- Audit shall be carried out by personnel who have no direct responsibility or control of that area so as to avoid any conflict of interest.
- Audit checklists are made for the audit team members.

Audit findings along with summary of non-conformity reports shall be submitted by audit team to Management Representative / Incharge-QA.

Non conformity reports along with audit observations shall be sent to the personnel having responsibility in the area audited to take necessary corrective action with agreement of date.

Once MR / Incharge-QA received the corrective actions from the concerned function, MR / Incharge-QA shall ensure verification of implementation of corrective actions taken through any of qualified internal auditors.

After verification, non-conformities shall be closed by MR the same copy of closed non-conformance report shall be send to the concerned functional head for their records.

All the records shall be documented and maintained. Summary shall be prepared for review by management.

All functional areas identified in Quality Manual shall be audited at least twice a year.

Reference Documents:

Procedure for Internal audit : JFL/SP/03

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8.2.3 Monitoring and Measurement of Processes

JFL applies suitable methods for monitoring & where applicable measurement of QMS processes. These methods demonstrate their ability to achieve planned results. When planned results are not achieved, appropriate preventive and corrective actions are taken to ensure conformity of the product.

Departmental Managers are responsible for monitoring & measurement of processes in their respective areas.

8.2.4 Monitoring and Measurement of Product

JFL monitors & measures the characteristic of the product to verity that product requirements are being met. This verification is carried out at different stages of product realization. Evidence of conformity with acceptance criteria is maintained.

Non-compliant fittings shall be rejected and identified suitably on socket face / RED color paint over fitting body. Also unaccepted fittings shall be reworked and identified separately. After rework the same shall be checked and ensure the quality of fittings for compliance.

Compliant fittings shall be passed to next process without having any of the above mark on socket, which is documented and made available to all process stations in a controlled manner.

Final inspection shall accept the fitting only after verifying that all the entries of previous stations are complete & acceptable.

The personnel who are designated as Jr. Executive / Astt. Engineer & above in quality department are authorized for the release of product after completion & verification of all required tests.

8.3 Control of nonconforming product

Non - conforming products are controlled to prevent its unintended use. The control shall provide for identification, documentation, evaluation, segregation & disposition of non-conforming product & rectification of the functions concerned.

Non - conforming incoming materials are immediately brought in to the attention of supplier & suitable actions are to be taken.

Non - conformance's found at any inspection / testing stage shall be mentioned in Inspection / Testing reports and sent for necessary corrective action by the concerned inspector. The instruction for corrective action to be taken shall be mentioned in the Production information System.

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Repair and or / reworked product shall be re-inspected in accordance with the QAP and / or documented procedures.

Repetitive type of non-conformance is brought to the knowledge of Head - Quality for further action.

Non-conforming products as per QAP, which cannot be allowed for rework are marked and segregated. The non-conformance report is generated by the Incharge (QC) and forwarded to Head-Quality for evaluation and disposition. Head-Quality ensures that such products are not monogrammed and sends a non-conformance report to the concerned sectional head.

The field non - conformance incidents are received by Head-Marketing and documented. JFL nominates its representative to verify the field non-conformances and from the findings, JFL analyses and establishes the causes of non-conformance with General Manager and Head –Quality and shall take necessary corrective action.

When non-conforming product is detected after delivery or use, JINDAL FITTINGS LTD shall take appropriate corrective action.

Reference Documents:

Procedure for Control of non-conforming product: JFL/SP/04

8.4 Analysis of Data

The need for the application of statistical techniques required for establishing, controlling & verifying various process capability and product characteristics are identified, implemented & controlled.

Statistical techniques are used to meet the requirements of process control, product characteristics, and maintenance of equipment, supplier performance & customer satisfaction.

Head-Marketing shall be responsible for documenting the customer feedback & initiating the necessary actions for achieving the customer satisfaction. The details regarding customer feed backs, quality, deliveries, complaints, etc. shall be analyzed along with General Manager / Head – Quality & report the trend to the management.

Incharge-QC shall be responsible to segregate & analyze data from various areas in process inspection & test reports & use suitable graphical method to analyze the trends prevalent & inform management on monthly basis.

Incharge-QC shall also be responsible to select & analyze data from final inspection & test results to find the trends in dimensional variation and inform management on monthly basis.

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Incharge-QA shall be responsible to analyze using suitable, graphical method, the raw materials, mechanical and chemical properties at the end of campaign & reports the trend to management.

Manager - Production shall be responsible to collect, segregate & analyze data from various maintenance, inspection & production delay reports, using suitable graphical method & reports.

8.5 Improvement

8.5.1 Continual improvement

Through management reviews of the departmental activities, JINDAL FITTINGS LTD management identifies the tasks for continual improvement of products and various processes, using the information relating to the Quality policy, Quality objectives, audit results, analysis of data, corrective and preventive actions.

Concerned department Managers plan the course of action for improvement and implement the same as per targeted time frames. The relevant managers review the progress of actions for improvement with concerned personnel till their completion.

When the improvement actions are found to be effective, they are incorporated in the Quality Management System by making suitable changes in the relevant documents such as drawings, specifications, procedures, work instructions, Quality plans, inspection, testing and check list documents.

8.5.2 Corrective action

Corrective action is implemented to eliminate the causes of actual non-conformities in order to prevent recurrence. Any corrective action will be taken to a degree appropriate to the problem and commensurate with the risks encountered. Any changes to the documented procedures resulting from corrective action are implemented & recorded.

MR is responsible to ensure the implementation of the system related with the corrective action.

A procedure has been established to determine appropriate corrective action. The procedure defines the requirement for following:

- Reviewing Non-conformities (including customer complaints)
- Determining the causes of non-conformities.
- Evaluating the need for action to ensure that non-conformities do not recur.
- Determining and implementing the action needed.
- Recording result of action taken.
- Reviewing the effectiveness of corrective action taken.

Reference Documents:

Procedure for Corrective & Preventive action : JFL/SP/05

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8.5.2 Preventive action

Procedures have been established to determine appropriate preventive action to eliminate the causes of potential non-conformities to prevent their occurrence. Preventive actions are taken considering the effect of potential non-conformity. The procedure defines the requirement for following:

- Determines potential non-conformities
- Evaluating the need for action, to prevent occurrence of non -Conformities.
- Determining and implementing preventive action needed.
- Recording results of action taken.
- Reviewing the effectiveness of preventive action taken.

Reference Documents:

Procedure for Corrective & Preventive action: JFL/SP/05

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ANNEXURE - 1

LIST OF QMS PROCESSES AND THEIR INTERRELATION

Sl. No.	Process Description	Responsibility	Document control method	Interrelation with Department
1	Resource Management	Executive Director	JFL/PM/HR	Marketing, Purchase, Stores, Logistics / Dispatch, Production, Quality, Maintenance, Accounts
2	Marketing	Head-Marketing	JFL/PM/MKT	Logistics / Dispatch, Quality, HR, Production, Finance and Customers
3	Purchase	Head – Purchase	JFL/PM/PUR	Production, Maintenance, Quality, Stores, Accounts, Logistics, HR and Suppliers
4	Stores	Head – Stores	JFL/PM/STO	Production & Maintenance, Finance, Quality, Purchase, Logistics, HR and Suppliers
5	Logistics/Dispatch	Head – Logistics	JFL/PM/LOG	Accounts, Quality, Purchase, Stores, HR and Production.
6	Production	Manager Production / Manager Pattern shop	JFL/PM/OP	Quality, Maintenance, HR, Purchase, Stores, Logistics, Marketing and Accounts
7	Maintenance	Head - Maintenance	JFL/PM/MM JFL/PM/ELE	Production, Quality, Purchase, Stores, Logistics, HR and Accounts.
8	Inspection and Testing	Incharge – QC	JFL/PM/QC	Operation, Marketing, Purchase, Stores, Logistics, HR, Finance, Customers and Inspection agencies.
9	Calibration	Incharge – QA	JFL/PM/QA	Operation, Electrical, supplier, Purchase, Stores and Finance.
10	Auditing	MR	JFL/PM/MR	Marketing, Production & Maintenance, Quality, HR, Purchase, Stores, Logistics.
11	Management Review	Executive Director	JFL/PM/MRM	All HOD's (Production & Maintenance, Quality, Marketing, Purchase. Stores, Logistics, HR, Finance and MR)

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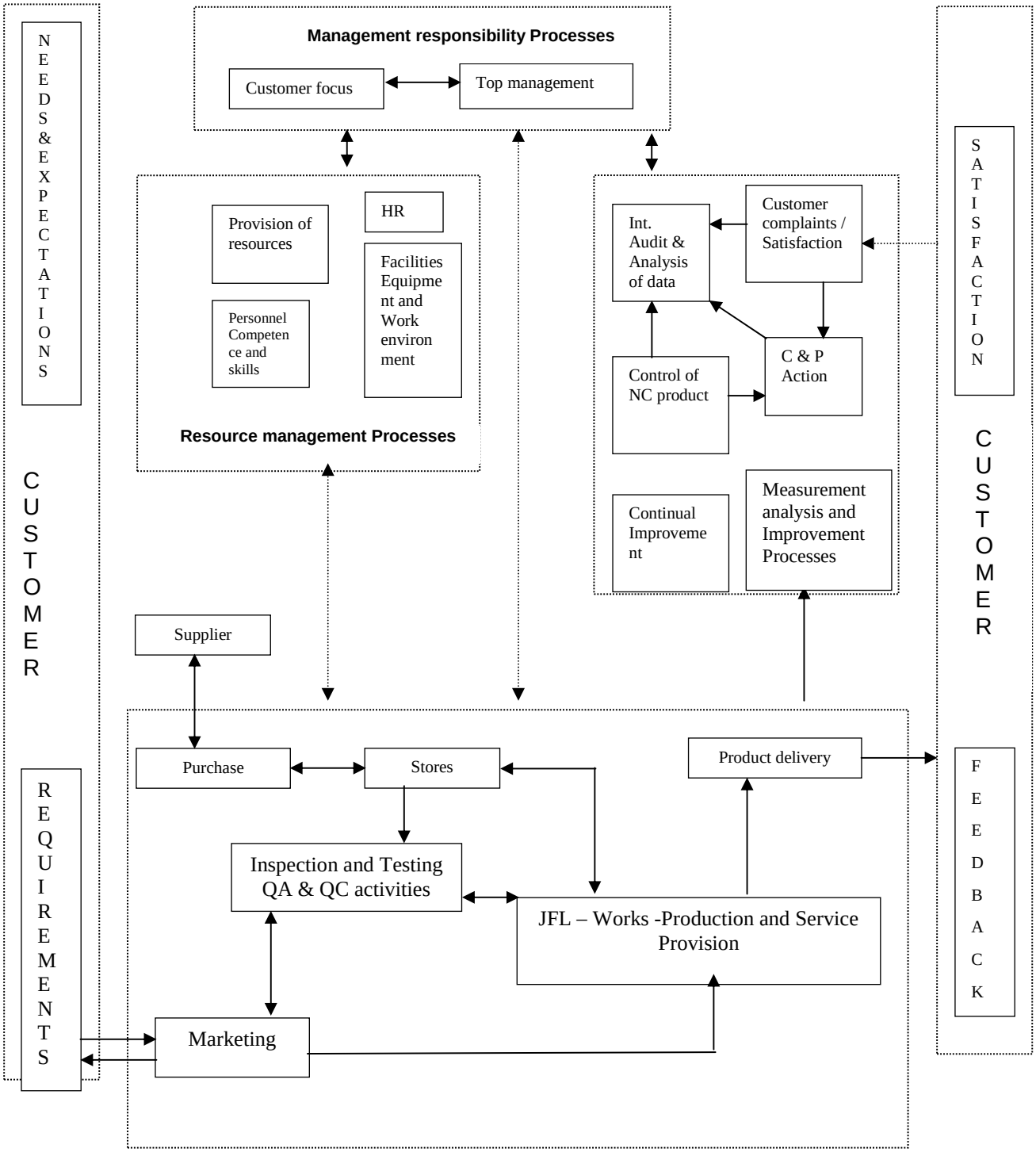
ANNEXURE – 2

The activities in **JINDAL FITTINGS LTD** and their interactions are shown below:



Product Realization Processes

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ANNEXURE – 3

PROCESS ACTIVITY CHART

Clause No.	Process Activity	Quality Management Section Reference	Procedure No.	Work Instruction No.	Format No.
4.0	Quality Management System & their requirement	QM Sec. 4.0.	JFL/SP/01 JFL/SP/02	-----	JFL/F/QS-01-12
5.0	Management Responsibility	QM Sec. 5.0.	JFL/SP/09	------	-----
6.0	Resource Management.	QM Sec. 6.0	JFL/SP/06	-----	JFL/F/HR- 01 to 11
7.0	Product Realization				
7.1	Planning of Product Realization	QM Sec. 7.1	JFL/SP/01 TO 20	JFL/WI/01 to 27	JFL/F/QA/01 to 20
7.2	Customer Related Process	QM Sec. 7.2	JFL/SP/09	------	JFL/F/MKTG-01 to 03
7.4	Purchasing	QM Sec. 7.4	JFL/SP/08 JFL/SP/14	-------	JFL/F/PUR-01 to 04
7.5	Production provision : - Control of Production - Validation of Process for Production Identification& Traceability - Customer Property - Preservation	QM Sec. 7.5.1, 7.5.2, 7.5.3, 7.5.4 and 7.5.5	JFL/SP/01 to 20	JFL/WI/01 to 27	JFL/F/OP/01-07
7.6	Control of Monitoring & Measuring Devices.	QM Sec. 7.6	JFL/SP/19	JFL/WI/25 & 26	
8.0	Measurement Analysis & Improvement				
8.1	General	QM Sec. 8.1	-------	------	------
8.2	Monitoring & Measurement	QM Sec. 8.2.1, 8.2.2, 8.2.3 & 8.2.4	JFL/SP/03,05 JFL/SP/09	------	-----
8.3	Control of non-conforming Product	QM Sec. 8.3	JFL/SP/04	------	JFL/F/QA/01
8.4	Analysis of Data	QM Sec. 8.4	-----	------	-----
8.5	Improvements	QM Sec. 8.5.1, 8.5.2 & 8.5.3	JFL/SP/05	-------	JFL/F/QS-08/12

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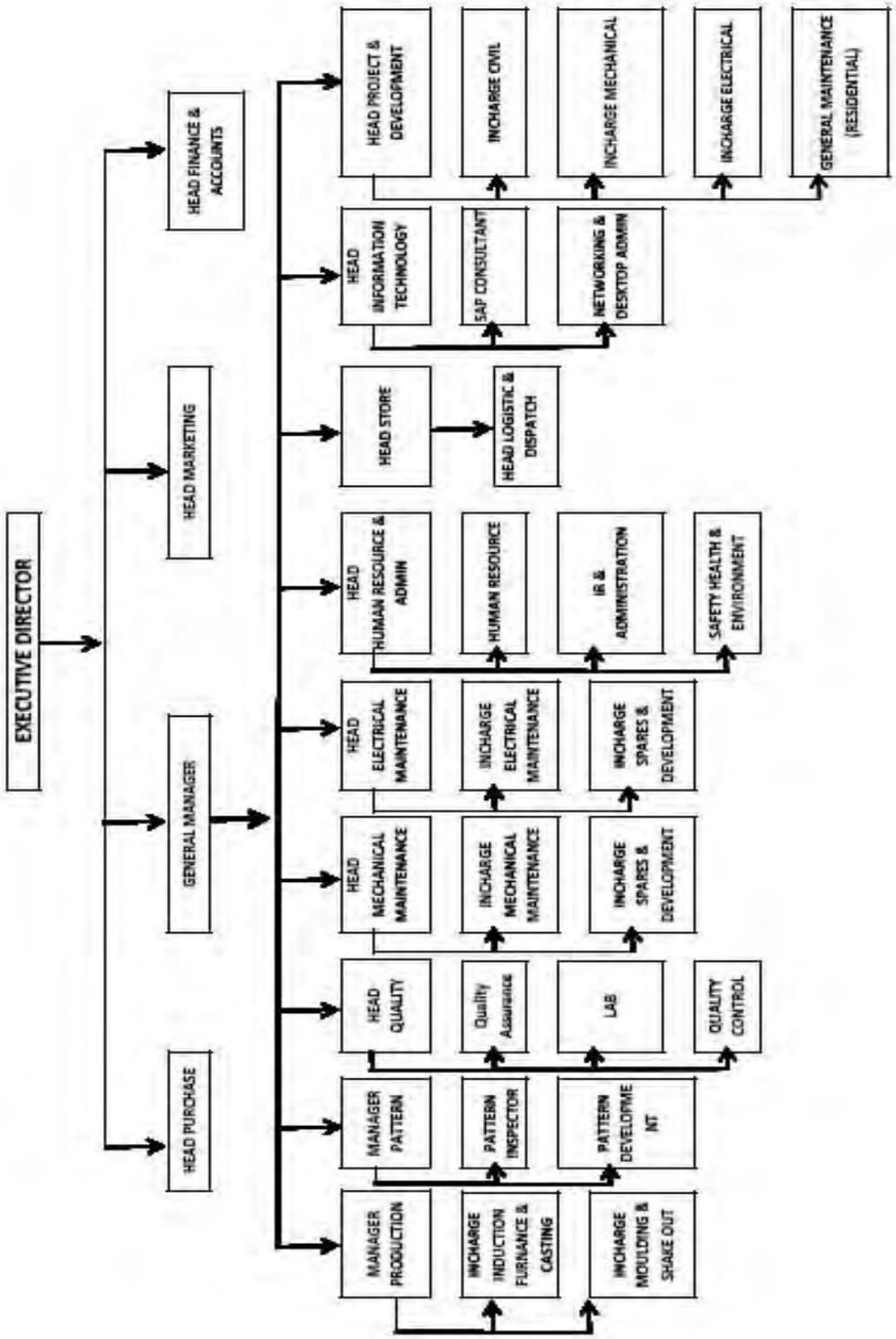
ANNEXURE – 4 ORGANISATION CHART



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ANNEXURE - 5

List of Standard Operating Procedures:

Sr. No.	Standard Operating Procedures	Doc. Ref. No.
1	Control of Documents	JFL/SP/01
2	Control of Records	JFL/SP/02
3	Internal Audit	JFL/SP/03
4	Control of Non-conforming Products	JFL/SP/04
5	Corrective and Preventive Action	JFL/SP/05
6	Training and Qualification Requirements	JFL/SP/06
7	Stores	JFL/SP/07
8	Purchase	JFL/SP/08
9	Contract Review	JFL/SP/09
10	Core & Mould Process	JFL/SP/10
11	Handling and Storage	JFL/SP/11
12	Pattern Maintenance	JFL/SP/12
13	Plant Maintenance	JFL/SP/13
14	Receiving Inspection	JFL/SP/14
15	Logistics / Dispatch	JFL/SP/15
16	Handling and Storage	JFL/SP/16
17	Inspection	JFL/SP/17
18	Marking and Stenciling	JFL/SP/18
19	Calibration of Measuring and Monitoring Devices	JFL/SP/19
20	Identification and Traceability	JFL/SP/20

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List of Work Instructions:

Sr. No.	Work Instructions	Doc. Ref. No.
1	Pattern Shop	JFL/WI/01
2	Melting & Pouring operation	JFL/WI/02
3	Sand preparation for no-bake process	JFL/WI/03
4	Moulding & Core (no-bake) operation	JFL/WI/04
5	Shake out and Sand reclamation operation	JFL/WI/05
6	Sand preparation - Green sand method	JFL/WI/06
7	Green sand Moulding and shakeout	JFL/WI/07
8	Cold box core machining	JFL/WI/08
9	Shot blast & fettling operation	JFL/WI/09
10	Machining	JFL/WI/10
11	Hydrostatic Pressure testing	JFL/WI/11
12	FBE Internal / External Coating	JFL/WI/12
13	Internal Cement Mortar lining operation	JFL/WI/13
14	External Bitumen/Epoxy Coating operation	JFL/WI/14
15	Raw Material testing	JFL/WI/15
16	Sand Testing	JFL/WI/16
17	Chemical composition analysis	JFL/WI/17
18	Metallographic examination	JFL/WI/18
19	Mechanical Testing	JFL/WI/19
20	Visual & Dimensional Inspection Of Pattern	JFL/WI/20
21	Visual & Dimensional Inspection Of Casted Fittings	JFL/WI/21
22	Inspection of Internal / External Coating	JFL/WI/22
23	Mechanical & Utilities Maintenance	JFL/WI/23
24	Electrical and Instrumentation Maintenance	JFL/WI/24
25	Calibration of Equipment- Electrical	JFL/WI/25
26	Calibration of Equipment- Quality	JFL/WI/26
27	Storage , Packaging & Dispatch	JFL/WI/27

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QUALITY ASSUARANCE PLAN (STD)
ISO 2531:2009

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Format No : JFL/QAP/2531
		Revision No. : 01
	DUCTILE IRON FITTINGS as per ISO 2531	Effective Date : 15.07.2014

CLIENT NAME:- GENERAL

P.O. NO. :- ----------

P.O. DATE :- ----------

STANDARD REFERENCES	
ISO 9001	: Quality management system - Requirements
ISO 2531/2009	: Ductile Iron pipes, fittings, accessories and their joints for water application
EN 545:2010	:Ductile iron pipes, fittings, accessories and their joints for water pipelines — Requirements and test methods.
ISO 6506-1	: Metallicmaterials- Brinell hardness test
ISO 4633	: Rubber Seals-Joint ring for wate rsuplly,drainage and sewarge pipelines- Specification for materials
BS EN 1092	: Flanges and their joints - Circular flanges for pipes, valves,fittings & accessories, PN designated. Part 2: Cast iron flanges
ISO 10803	: Design method for Ductile Iron fittings
ISO 8179 -2	: Ductile Iron pipes - External Zinc Coating - (Part 2- Zinc Rich Paint with finishing layer)
ISO 4179	: Ductile iron pipes and fittings for pressure and non-pressure pipelines - Cement mortar lining
ISO 6892-1	: Metallic materials — Tensile testing -
ISO 8501-1	: Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness. Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings

Abbreviations:

R: Document review, **T**: Test, **W**: Witness, **H**: Hold point, **TPIA**: Third Party Inspection Agency, **Cont**: Contractor, **PO**: Purchase Order

Prepared By
Incharge QA

JINDAL FITTINGS TEMBHURNI

Approved By
Head Quality

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Format No : JFL/QAP/2531
	DUCTILE IRON FITTINGS as per ISO 2531	Revision No. : 01
		Effective Date : 15.07.2014

CLIENT NAME:- GENERAL

P.O. NO. :- ----------

P.O. DATE :- ----------

S.No	Inspection Item	Inspection Method	Acceptance criteria	Documentation by	Inspection/Test Manufacturer Type	Inspection/Test Manufacturer Frequency	Cust / TPIA	Remarks
1	**Pre-inspection**							
1.1	Product specification of the order	Review of documents	Acknowledgement of order	Purchase order	R	Every order	R	
1.2	Marking instructions							
1.3	Applicable standards							
1.4	Quality system		Validity of the certificate					
2	**Post Casting Inspection**							
2.1	A. AFTER FETTLING & SHOT BLASTING							
2.1.1	External appearance	Visual	IS0 2531:2009, Cl 4.1.2	JFL/F/QA/05	T	Each Fitting	R	
2.1.2	Internal Fitting appearances	Visual			T	Each Fitting	Samples can be witnssed	
2.1.3	Fitting wall thickness	UTG / Caliper	IS0 2531:2009, Cl 4.2.3.3	JFL/F/QA/01	T	10% of all other products across all sizes, 100% for 90 & 45 deg bends		
2.1.4	Length	Measuring tape	Table No. -6	JFL/F/QA/01	T	1 No./day / Item		
			Types of Fittings / Nominal Diameter (mm) / Deviation in L and H (mm)					
			Flanged sockets, Flanged Spigot, Collars, Tapers: 80 -1200 — ± 25					
			Flanged sockets, Flanged Spigot, Collars, Tapers: 1400- 2000 — ± 35					
			Tees: 80 -1200 — +50/-25					
			Tees: 1400 to 2600 — +75/-35					
			Bends 90 ° (1/4): 80 to 2600 — ±(15+0.03 DN)					
			Bends 45 ° (1/8): 80 to 2600 — ±(10+0.025 DN)					
			Bends 22 °30' (1/16) & Bends 11 °15' (1/32): 80 to 2600 — ±(10+0.02 DN)					
			Bends 22 °30' (1/16) & Bends 11 °15' (1/32): 1400 to 2600 — ±(10+0.025 DN)					
2.1.5	Internal Diameter (Only socket End)	Gauge/Caliper	IS0 2531:2009, Cl 4.2.2.2	JFL/F/QA/01	T	1 No./Shift / Item		
2.2	**C. AFTER MACHINING**							
			BS EN 1092, Cl No. 4.1.3.2					
2.1.2	Bolt Hole dia.,(d) (mm)	Caliper	≤ M33 (37) : +1.5/-0 , M36 (40) to M39 (43):+2/-0 M45 (49) to M52 (57):+2.5/-0 > M52 (57) : +2.5/-0	JFL/F/QA/17	T	Each Fitting	Samples can be witnssed	
2.1.3	Face Height (f) (mm)	Caliper	1 minimum		T	Each Fitting		

Prepared By
Incharge QA

JINDAL FITTINGS LTD TEMBHURNI

Approved By
Head Quality

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Format No : JFL/QAP/2531
	DUCTILE IRON FITTINGS as per ISO 2531	Revision No. : 01
		Effective Date : 15.07.2014

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S.No	Inspection Item	Inspection Method	Acceptance criteria	Documentation by	Inspection/Test Manufacturer Type	Inspection/Test Manufacturer Frequency	Cust / TPIA	Remarks
2.1.4	Pitch Circle Diameter	Gauge/Caliper	M10 : ±1 M12 : ±2 M14 to M20:±3 M24 to M33: ±4 M36 to M52 : ±5 > M52 : ±6		T	Each Fitting	Samples can be witnssed	
2.1.5	Spigot End Ovality	Gauge / Caliper	ISO 2531 Cl No. 4.2.2.1 Ovality Should not exceed 1% of DE for DN 250 to DN 600 or 2% for DN>DN 600	JFL/F/QA/01	T	Each Fitting		
3	**a) Mechanical Properties**		ISO 2531:2009, Table No. 08, Cl. No 4.3.2			Each Heat. Test Bar Standard: 01. DN80 - 450: Test Bar sample 12.5 mm machined to 6mm ± 0.06 mm, ovality=0.03mm 02. DN 500 & Above: Test Bar sample 25 mm machined to 14mm ± 0.0.09 mm, ovality= 0.04mm		
3.1	-Tensile strength	Tensile testing machine	≥420 MPa	JFL/F/QA/02	T		R	
3.2	-Elongation (A)		≥5%		T			
3.3	-Brinell hardness (HB)	Brinell testing machine	250HBW Max		T			
4	**Hydrostatic Pressure Test**		No leakage/Sweating at the test pressure - Table no 13					
	Test	Hydrostatic Pressure Testing	Size: 80 - 300 — Pressure (bar): 25	JFL/F/QA/07	T	Each Fitting gets pressure tested	R	
			Size: 350 - 600 — Pressure (bar): 16					
			Size: 700 - 1200 — Pressure (bar): 10					
		Pnuematic Pressure Testing	Size: 1400-2000 — Pressure (bar): 1					
5	**Metallic Zinc or Zinc Rich Paint Application**							
5.1	Zinc rich paint	Check material type, certificate, and pot life & shelf life	More than 85 % content in dry film for zinc rich paint	Supplier TC	R	Each batch	R	
5.2	-Surface cleanliness	Visual	JFL/WI 14	---	T	Each Fitting	R	
5.3	-Coating appearance	Visual	ISO 8179 - 2 / IS0 2531 Annex A	---	T	Each Fitting	R	
5.4	-Mass	Mass Check	ISO 8179 - 2 / IS0 2531 Annex A	JFL/F/QA/11	T	1No/Size/Shift/F.Line	R	

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JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Format No : JFL/QAP/2531
		Revision No. : 01
	DUCTILE IRON FITTINGS as per ISO 2531	Effective Date : 15.07.2014

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S.No	Inspection Item	Inspection Method	Acceptance criteria	Documentation by	Inspection/Test Manufacturer Type	Inspection/Test Manufacturer Frequency	Cust / TPIA	Remarks
6	**Cement Mortar Lining**							
6.1	Cement	Review of Test certificate	Supplier Certificate	Supplier TC	T	Each Consignment	R	
6.2	Sand (Grain size distribution & clay contents)	Granulometry	ISO 4179	JFL/F/QA/04	T	Each Consignment	R	
6.3	Water	Analysis	Potable water	Water Test Report	T	Yearly	R	
6.4	Sand - Cement Ratio	Weighing scale	ISO 4179 (S/C≤3.5)	JFL/F/OP/09	T	Each Fitting	R	
6.5	Surface preparation before lining	Visual	ISO 4179	Register	T	Each Fitting	R	
6.6	Curing	Visual	Natural Curing for 24 Hours	Register	T	Every Batch	R	
6.7	Non Toxicity lining surface	BS 6920 - 1	WRAS Approval	WRAS Certificate	T	Check Validity	R	
6.8	Lining thickness	Digital Coat Meter	DN: 80 – 300; Thickness (mm) Min 2.0, Nom 3.0 DN: 350 – 600; Thickness (mm) Min 3.0, Nom 5.0 DN: 700 - 1200; Thickness (mm) Min 3.5, Nom 6.0 DN: 1400-2600; Thickness (mm) Min 6.0, Nom 9.0	JFL/F/QA/06	T	2 Nos / Size/Shift	W(10%)	Checked accordingly in case of special requirement.
7	**External Coating with Bitumin / Fusion Bonded Epoxy (FBE) Coating**							
7.1	**External Coating with Bitumin Coating**							
7.1.1	Bitumen / Epoxy	Check material type, certificate, and pot life & shelf life	As per coating manufacturer's recommendation and procedures	Test Report	R	Each Consignment	R	
7.1.2	Physical Properties	B4 Cup & Hydrometer	JFL/MS/01	JFL/MS/01	T	Each Consignment	R	
7.1.3	Coating thickness			JFL/F/QA/06				Checked accordingly in case of special requireme
7.1.4	Dry film thickness	Coat meter/Mylar sheet	Mean ≧ 70µm, (Min at any point≧50µm)		T	Each Fittings	W(15%)	
7.1.5	Appearance	Visual	No coating defects		T	Each Fittings	W(15%)	
7.1.6	Non Toxicity	BS 6920 - 1	WRAS approval	WRAS Certificate	T	To Check Validity	R	

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JINDAL FITTINGS LTD TEMBHURNI

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JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Format No : JFL/QAP/2531
	DUCTILE IRON FITTINGS as per ISO 2531	Revision No. : 01
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S.No	Inspection Item	Inspection Method	ISO 4179 Cl no 5.1 Table No 1	Documentation by	Inspection/Test Manufacturer Type	Inspection/Test Manufacturer Frequency	Cust / TPIA	Remarks
7.2	**External Coating with Fusion Bonded Epoxy (FBE) Coating**							
7.2.1	Surface preparation	Visual	EN 14901 Cl No. 5.2 and 7.1.1 - Sa 2.5	JFL/F/QA/23	T	100%	R	
7.2.1	Appearance	Visual	EN 14901 Cl No. 5.3 and 7.1.2 - Uniform free from pin holes and bubbles	JFL/F/QA/23	T	100%	R	
7.2.3	Adhesion	Pull off adhesion test	EN 14901 Cl No. 5.4 and 7.1.3 - Mean Value ≧ 8MPa Minimum Single value ≧ 6 MPa	JFL/F/QA/23	T	Once/ThreeMonths	R	
7.2.4	Coating thickness	Non destructive method	EN 14901 Cl No. 5.5 and 7.1.4 - Mean ≧ 250µm (Body)	JFL/F/QA/23	T	1 / Shift	R	
7.2.5	Cross Linkage	MIBK Test	EN 14901 Cl No. 5.6 and 7.1.5 - No deviation against reference test sample	JFL/F/QA/23	T	1 / Shift	R	
7.2.6	Non Toxicity	BS 6920 - 1	WRAS Approval	WRAS Certificate	T	Check Validity	R	
8	**Packing**							
8.1	-Appearance	Visual	No damage	---	T	Each packing	W(100%)	
8.2	-Marking on pipes	Visual	As per IS0 2531 : Cl No 4.6 and JFL/SP/18		T	Each Fittings	W(100%)	
9	**EPDM Rubber Gasket**							
9.1	Type of joint	Visual			W	Each delivery	R	
9.2	Packing & marking	Visual	Conformity with purchase order	Test Certificate	W		W(10%)	
9.3	Physical properties	ISO 4633	As Per ISO 4633	Test Certificate	T		R	
9.4	Non Toxicity	BS 6920	WRAS Approval	WRAS Certificate	T		R	
9.5	Dimensions & Hardness	Vernier,Pi Tape & Shore A Hardness tester	As per drawing no JFL-PS-STD-52	Test Certificate	T	2Nos / Size / Consignment	R	
10	**Performance test Method**							
10.1	1. Leaktightness of joints to positive internal pressure		ISO 2531:2009, Clause 5.0 , 7.0 ± 0.5 bar for 2 hours	Test Report Witnessed by TPIA	W	DN 200, DN 400 & DN 800	R	
10.2	a. Joints alligned and subjected to shear							
10.3	b. Joint deflection							
10.4	2. Leaktightness of joints to positive External pressure		ISO 2531:2009, Clause 5.0 , 7.0 ± 0.1 bar for 2 hours					
10.5	3. Leaktightness of joints to negative internal pressure		ISO 2531:2009, Clause 5.0 , 7.0 ± 0.09 bar for 2 hours					
10.6	a. Joints alligned and subjected to shear							
10.7	b. Joint deflection							

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Incharge QA

JINDAL FITTINGS LTD TEMBHURNI

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QUALITY ASSUARANCE PLAN (STD)
BS EN 545:2010

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP) DUCTILE IRON FITTINGS as per BS EN 545:2010	Format No Revision No. Effective Date	: JFL/QAP/545 : 00 : 15.07.2014

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STANDARD REFERENCES	
ISO 9001	: Quality management system - Requirements
EN 545:2010	: Ductile iron pipes, fittings, accessories and their joints for water pipelines — Requirements and test methods.
ISO 6506-1	: Metallicmaterials- Brinell hardness test
ISO 4633	: Rubber Seals-Joint ring for wate rsuplly,drainage and sewarge pipelines- Specification for materials
EN 1092	: Flanges and their joints - Circular flanges for pipes, valves,fittings & accessories, PN designated. Part 2: Cast iron flanges
ISO 10803	: Design method for Ductile Iron fittings
ISO 8179 -2	: Ductile Iron pipes - External Zinc Coating - (Part 2- Zinc Rich Paint with finishing layer)
ISO 4179	: Ductile iron pipes and fittings for pressure and non-pressure pipelines - Cement mortar lining
ISO 6892-1	: Metallic materials — Tensile testing -
ISO 8501-1	: Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness. Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings
BS 6920-1:2000	: Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water. Specification

Abbreviations:

R: Document review, **T**: Test, **W**: Witness, **H**: Hold point, **TPIA**: Third Party Inspection Agency, **Cust**: Customer, **PO**: Purchase Order

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JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP) DUCTILE IRON FITTINGS as per BS EN 545:2010	Format No : JFL/QAP/545 Revision No. : 00 Effective Date : 15.07.2014

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S.No	Inspection Item	Inspection Method	Acceptance criteria	Document	Inspection/Test Type	Inspection/Test Manufacturer Frequency	Inspection/Test Cust / TPIA	Remarks
1	**Pre-inspection**							
1.1	Product specification of the	Review of documents	Acknowledgement of order	Purchase order	R	Every order	R	
1.2	Marking instructions							
1.3	Applicable standards							
1.4	Quality system		Validity of the certificate	ISO 9001 Certificate				
2	**Post Casting Inspection**							
2.1	**A. AFTER FETTLING & SHOT BLASTING**							
2.1.1	External appearance	Visual	BS EN 545, Cl 4.1.2	JFL/F/QA/05	T	Each Fitting	R	
2.1.2	Internal Fitting appearances	Visual			T	Each Fitting	Samples can be witnssed	
2.1.3	Fitting wall thickness	UTG / Caliper	EN 545 Cl No. 4.3	JFL/F/QA/01	T	10% fol all other products across		
2.1.4	Length	Measuring tape/ Scale	As per BS EN 545 Table No. -6	JFL/F/QA/01	T	1 No./day / Item		
			Types of Fittings: Flanged sockets,Flanged Spigot, Collars, Tapers — Nominal Diameter (mm): 80 -1200 — Deviation in L and H (mm): ± 25					
			Types of Fittings: Flanged sockets,Flanged Spigot, Collars, Tapers — Nominal Diameter (mm): 1400- 2000 — Deviation in L and H (mm): ± 35					
			Types of Fittings: Tees — Nominal Diameter (mm): 80 -1200 — Deviation in L and H (mm): +50/-25					
			Types of Fittings: Tees — Nominal Diameter (mm): 1400 to 2600 — Deviation in L and H (mm): +75/-35					
			Types of Fittings: Bends 90 ° (1/4) — Nominal Diameter (mm): 80 to 2600 — Deviation in L and H (mm): ±(15+0.03 DN)					
			Types of Fittings: Bends 45 ° (1/8) — Nominal Diameter (mm): 80 to 2600 — Deviation in L and H (mm): ±(10+0.025 DN)					
			Types of Fittings: Bends 22 °30' (1/16) & Bends 11 °15' (1/32) — Nominal Diameter (mm): 80 to 2600 — Deviation in L and H (mm): ±(10+0.02 DN)					
			Types of Fittings: Bends 22 °30' (1/16) & Bends 11 °15' (1/32) — Nominal Diameter (mm): 1400 to 2600 — Deviation in L and H (mm): ±(10+0.025 DN)					
2.1.5	Internal Diameter (Only socket End)	Gauge/Caliper	As per DRG No - JFL-SOCKET - 801200	JFL/F/QA/01	T	1 No./Shift / Item		
2.2	**AFTER MACHINING**							
			BS EN 1092, Cl No. 4.1.3.2					
2.2.1	Bolt Hole dia.,(d) (mm)	Caliper	≤ M33 (37) : +1.5/-0 , M36 (40) to M39 (43):+2/-0 M45 (49) to M52 (57):+2.5/-0 > M52 (57) : +2.5/-0	JFL/F/QA/17	T	Each Fitting	Samples can be witnssed	
2.2.2	Face Height (f) (mm)	Caliper	1mm minimum		T	Each Fitting		
2.2.3	Pitch Circle Diameter	Gauge/Caliper	M10 : ±1 M12 : ±2 M14 to M20:±3 M24 to M33: ±4 M36 to M52 : ±5 > M52 : ±6		T	Each Fitting		
2.2.4	Spigot End Ovality	Gauge / Caliper	Ovality Should not exceed 1% of DE for DN 250 to DN 600 or 2% for DN>DN 600	JFL/F/QA/01	T	Each Fitting		

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JINDAL FITTINGS LTD TEMBHURNI

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JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP) DUCTILE IRON FITTINGS as per BS EN 545:2010	Format No : JFL/QAP/545 Revision No. : 00 Effective Date : 15.07.2014

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S.No	Inspection Item	Inspection Method	Acceptance criteria		Document	Inspection/Test Manufacturer Type	Inspection/Test Manufacturer Frequency	Cust / TPIA	Remarks
3	**a) Mechanical Properties**		BS EN 545 Cl No. 4.4				Each Heat. Test Bar Standard: 01. DN80 - 450: Test Bar sample 12.5 mm machined to 6mm ± 0.06 mm, ovality=0.03mm 02. DN 500 & Above: Test Bar sample 25 mm machined to 14mm ± 0.0.09 mm, ovality= 0.04mm		
3.1	Tensile strength	Tensile testing machine	≥420 MPa		JFL/F/QA/02	T		R	
3.2	Elongation (A)		≥5%			T			
3.3	Brinell hardness (HB)	Brinell testing machine	250HBW Max			T			
4	**Hydrostatic Pressure Test**		No leakage/Sweating at the test pressure - Table no 13						
	Test	Hydrostatic Pressure	Size	Pressure (bar)	JFL/F/QA/07	T	Each Fitting gets pressure tested	R	
			80 - 300	25					
			350 - 600	16					
			700 - 1200	10					
		Pnuematic Pressure	1400-2000	1					
5	**Zinc Rich Paint Application**								
5.1	Zinc rich paint	Check material type, certificate, and pot life & shelf life	More than 90 % content in dry film for zinc rich paint		Supplier TC	R	Each batch	R	
5.2	Surface cleanliness	Visual	JFL/WI 14			T	Each Fitting	R	
5.3	Coating appearance	Visual	ISO 8179 - 2			T	Each Fitting	R	
5.4	Mass	Mass Check	ISO 8179 - 2		JFL/F/QA/11	T	1No/Size/Shift/F.Line	R	
6	**Cement Mortar Lining**								
6.1	Cement	Supplier certificate	EN 196-1		Supplier TC	T	Each Consignment	R	
6.1	Sand (Grain size distribution &	Granulometry	ISO 4179		JFL/F/QA/04	T	Each Consignment	R	
6.2	Water	Analysis	Potable water		Water Test Report	T	Yearly	R	
6.3	Sand - Cement Ratio	Weighing scale	ISO 4179 (S/C≤3.5)		JFL/F/OP/09	T	Each Fitting	R	
6.4	CML - No effect to water	Cube Test	AS per BE EN 545,Cl No. 4.5.3.2 & Cl No. 7.1 - UTS ≥ 50 Mpa		Register	T	1 Test /Month/Supplier	R	
6.5	Surface preparation before	Visual	ISO 4179		Register	T	Each Fitting	R	
6.6	Curing	Visual	Natural Curing for 24 Hours		Register	T	Every Batch	R	
6.7	Non Toxicity	BS 6920 - 1	WRAS Approval		WRAS Certificate	T	Check Validity	R	

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Incharge QA

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JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP) DUCTILE IRON FITTINGS as per BS EN 545:2010	Format No : JFL/QAP/545 Revision No. : 00 Effective Date : 15.07.2014

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S.No	Inspection Item	Inspection Method	Acceptance criteria			Document	Inspection/Test Manufacturer Type	Inspection/Test Manufacturer Frequency	Cust / TPIA	Remarks
6.4	Lining thickness	Digital Coat Meter	DN	Thickness (mm) Min	Nom	JFL/F/QA/06	T	2 Nos / Size/Shift	W(10%)	Checked accordingly in case of special requirement.
			80 – 300	2.5	5.0					
			350 – 600	3.0	5.0					
			700 - 1200	3.5	6.0					
			1400-2600	6.0	9.0					
7	**External Coating with Bitumen / Fusion Bonded Epoxy (FBE) Coating**									
7.1	**External Coating with Bitumen Coating**									
7.1.1	Bitumen / Epoxy	Check material type, certificate, and pot life & shelf life	As per coating manufacturer's recommendation and procedures			Test Report	R	Each Consignment	R	
7.1.2	Physical Properties	B4 Cup & Hydrometer	JFL/MS/01			JFL/MS/01	T	Each Consignment	R	
7.1.3	Dry film thickness	Coat meter/Mylar sheet	Mean ≧ 70µm, (Min at any point≧50µm)			JFL/F/QA/06	T	Each Fittings	W(15%)	
7.1.4	Appearance	Visual	No coating defects				T	Each Fittings	W(15%)	
7.1.5	Non Toxicity	BS 6920 - 1	WRAS approval			WRAS Certificate	T	To Check Validity	R	
7.2	**External Coating with Fusion Bonded Epoxy (FBE) Coating**									
7.2.1	Surface preparation	Visual	EN 14901 Cl No. 5.2 and 7.1.1 - Sa 2.5			JFL/F/QA/23	T	100%	R	
7.2.2	Appearance	Visual	EN 14901 Cl No. 5.3 and 7.1.2 - Uniform free from pin holes and bubbles			JFL/F/QA/23	T	100%	R	
7.2.3	Adhesion	Pull off adhesion test	EN 14901 Cl No. 5.4 and 7.1.3 - Mean Value ≧ 8MPa Minimum Single value ≧ 6 MPa			JFL/F/QA/23	T	Once/ThreeMonths	R	
7.2.4	Coating thickness	Non destructive method	EN 14901 Cl No. 5.5 and 7.1.4 - Mean ≧ 250µm (Body)			JFL/F/QA/23	T	1 / Shift	R	
7.2.5	Cross Linkage	MIBK Test	EN 14901 Cl No. 5.6 and 7.1.5 - No deviation against reference test sample			JFL/F/QA/23	T	1 / Shift	R	
7.2.6	Non Toxicity	BS 6920 - 1	WRAS Approval			WRAS Certificate	T	Check Validity	R	
8	**Packing**									
8.1	Appearance	Visual	No damage			---	T	Each packing	W(100%)	
8.2	Marking on pipes	Visual	JFL/SP/18			---	T	Each Fittings	W(100%)	

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Incharge QA

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JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP) DUCTILE IRON FITTINGS as per BS EN 545:2010	Format No Revision No. Effective Date	: JFL/QAP/545 : 00 : 15.07.2014

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S.No	Inspection Item	Inspection Method	Acceptance criteria	Document	Inspection/Test Manufacturer Type	Inspection/Test Manufacturer Frequency	Cust / TPIA	Remarks
9	**EPDM Rubber Gasket**							
9.1	Type of joint	Visual			W	Each delivery	R	
9.2	Packing & marking	Visual	Conformity with purchase order	Test Certificate	W		W(10%)	
9.3	Physical properties	ISO 4633	As Per ISO 4633	Test Certificate	T		R	
9.4	Non Toxicity	BS 6920 - 1	WRAS Approval	WRAS Certificate	T		R	
9.5	Dimensions & Hardness	Vernier,Pi Tape & Shore A Hardness tester	As per drawing no JFL-PS-STD-52	Test Certificate	T	2Nos / Size / Consignment	R	
10	**Performance test Method**							
10.1	1. Leaktightness of joints to positive internal pressure							
10.2	a. Joints alligned and subjected to shear		BS EN 545 Cl. 5.0					
10.3	b. Joint deflection							
10.4	2. Leaktightness of joints to positive External pressure		BS EN 545 Cl. 5.0	Test Report Witnessed by TPIA	W	DN 200, DN 400 & DN 800	R	
10.5	3. Leaktightness of joints to negative internal pressure							
10.6	a. Joints alligned and subjected to shear		BS EN 545 Cl. 5.0					
10.7	b. Joint deflection							

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Incharge QA

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QUALITY ASSUARANCE PLAN (STD)
BS EN 598

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Document No.: JFL/QAP/598 Revision No. : 00 Effective Date : 01.02.2014 Page No. :
	DUCTILE IRON FITTINGS as per BS EN 598 - 2009	

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STANDARD REFERENCES

ISO 9001/2008	: Quality management system - Requirements
BS EN 598: 2009	: Ductile Iron pipes, fittings, accessories and their joints for sewerage applications - requirements and test methods
BS EN 545:2010	: Ductile Iron pipes, fittings, accessories and their joints for water pipelines
BS EN 681 - 1	: Elastomeric seals - Material requirements – Vulcanized rubber
BS EN 196 - 1	: Methods of testing cement - Determination of strength
BS EN 197 - 1	: Cement - Composition, specifications and conformity criteria for common cements
ISO 6506-1	: Metallic materials-Brinell hardness test
ISO 6892-1	: Metallic materials-Tensile Testing-Part-1
BS EN 1092-2	: Flanges and their Joints

Abbreviations:

R: Document review, **T**: Test, **W**: Witness, **H**: Hold point, **TPIA**: Third Party Inspection Agency, **Cust**: Customer , **PO**: Purchase Order

Prepared By
Incharge -QA

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JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Document No.: JFL/QAP/598 Revision No. : 00 Effective Date : 01.02.2014 Page No. :
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S.No	Inspection Item	Inspection Method	Acceptance criteria	Document	Inspection/Test		Cust/ TPIA	Remarks
					Manufacturer			
					Type	Frequency		
1	**Pre-inspection**							
1.1	Product specification of the order	Review of documents	Acknowledgement of order		R	Every order	R	
1.2	Marking instructions							
13	Applicable standards							
1.4	Quality system		Validity of the certificate					
2	**Post Casting Inspection**							
2.1	**A. After Fettling & Shot Blasting**							
2.1.1	External appearance	Visual	BS EN 598 : 2009 (E), Clause 4.1.2	JFL/F/QA/05	T	Each Fitting	Samples can be witnessed	
2.1.2	Internal surface	Visual			T	Each Fitting		
2.1.3	Wall thickness	UTG/Caliper	BS EN 598 : 2009 (E), Clause 4.2.1	JFL/F/QA/01	T	2 No /Fitting/Shift		
2.1.4	Length	Measuring tape	BS EN 598 : 2009 (E), Clause 4.2.3.3					
			As per BS EN 545:2010 Table No.-6	JFL/F/QA/01	T	2 No /Fitting/Shift		
			Types of Fittings / Nominal Diameter (mm) / Deviation in L and H (mm)					
			Flanged sockets,Flanged Spigot, Collars,Tapers: 80 -1200: ± 25					
			Flanged sockets,Flanged Spigot, Collars,Tapers: 1400- 2200: ± 35					
			Tees: 80 -1200: +50/-25					
			Tees: 1400 to 2200: +75/-35					
			Bends 90 ° (1/4): 80 to 2200: ±(15+0.03 DN)					
			Bends 45 ° (1/8): 80 to 2200: ±(10+0.025 DN)					
			Bends 22 °30' (1/16) & Bends 11 °15' (1/32): 80 to 2200: ±(10+0.02 DN)					
			Bends 22 °30' (1/16) & Bends 11 °15' (1/32): 1400 to 2200: ±(10+0.025 DN)					
			Table No.-7					
			Types of Casting / Tolerance					
			Fittings for socketed joints: ±20					
			Pipes and fittings for flanged joints: ±10					
2.1.5	External Diameter	Gauge/Caliper Circumference tape	BS EN 598 : 2009 (E), Clause 4.2.2.1	JFL/F/QA/01	T	2 No /Fitting/Shift		
2.1.6	Internal Diameter	Gauge Caliper	BS EN 598 : 2009 (E), Clause 4.2.2.2	JFL/F/QA/01	T	2 No /Fitting/Shift		
2.1.7	Spigot Ovality	GO-NO GO Gauge/ Vernier Caliper	BS EN 598 : 2009 (E), Clause 3.36	JFL/F/QA/01	T	2 No /Fitting/Shift		

Prepared By
Incharge -QA

JINDAL FITTINGS LTD TEMBHURNI

Approved By
Head-Quality

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Document No.: JFL/QAP/598 Revision No. : 00 Effective Date : 01.02.2014 Page No. :
	DUCTILE IRON FITTINGS as per BS EN 598 - 2009	

CLIENT NAME:- GENERAL

P.O. NO. :- ----------

P.O. DATE :- ----------

S.No	Inspection Item	Inspection Method	Acceptance criteria		Document	Inspection/Test			Remarks
						Manufacturer		Cust/ TPIA	
						Type	Frequency		
2.2	**B. After Machining**								
2.2.1	Bolt Hole Diameter	Caliper	BS EN 1092-2		JFL/F/QA/17	T	2 No /Fitting/Shift	Samples can be witnssed	
2.2.2	Raised Face Height	Caliper				T	2 No /Fitting/Shift		
2.2.3	No. Of Holes	Visual				T	2 No /Fitting/Shift		
2.2.4	Pitch Circle Diameter	Gauge/Caliper				T	2 No /Fitting/Shift		
3	**Ductile Iron Test**								
3.1	a) Chemical analysis	Analysis before casting	JFL/MS/01		JFL/F/QA/03	T	Each Ladle	R	
3.2	b) Mechanical Properties		BS EN 598 : 2009 (E), Table No-3 Clause 4.3				Each Heat	R	
	-Tensile strength	Tensile testing machine	≥ 420 MPa		JFL/F/QA/02	T			
	-Elongation		≥ 5%		JFL/F/QA/02	T			
	-Brinell hardness (HB)	Brinell testing machine	250 HBW		JFL/F/QA/02	T			
4	**Hydrostatic/ Pneumetic Pressure Test**		No leakage/Sweating at the test pressure(As per BS EN 545)						
	Pressure Test	Hydrostatic and Visual for leak detection	Size	Required Pressure for all classes (bar)	JFL/F/QA/07	T	Each Fitting for not less than 15 seconds of total pressure cycle including 10 seconds at test pressure.	R	Check in case of special requirement with prior arrangement
			80 - 300	25					
			350 - 600	16					
			700 - 1200	10					
		Pnuematic and Visual for leak detection	1400-2200	1					
5	**Zinc Rich Paint Application**								
5.1	Zinc rich paint	Check material type, certificate, and pot life & shelf life	More than 90 % content in dry film for zinc rich paint		JFL/F/QA/06	R	Each Consigment	R	
5.2	Surface cleanliness	Visual	BS EN 598 : 2009 (E,),Clause 4.4.2.2			T	Each Fitting	R	
5.3	Coating appearance	Visual				T	Each Fitting	R	
5.4	Mass	Mass Check			JFL/F/QA/11	T	1 No/Size/Shift	R	
6	**External Coating with Bitumin / Fusion Bonded Epoxy (FBE) Coating**								
6.1	**External Coating with epoxy Coating**								
6.1.1	Bitumen / Epoxy	Check material type, certificate, and pot life & shelf life	As per coating manufacturer's recommendation and procedures		Test Report	R	Each Consignment	R	
	Physical Properties	B4 Cup & Hydrometer	JFL/MS/01		JFL/MS/01	T	Each Consignment	R	
6.1.2	Coating thickness				JFL/F/QA/06				Checked accordingly in case of special
	Dry film thickness	Coat meter/Mylar sheet	Mean ≥ 70µm, (Min at any point≥50µm)			T	Each Fittings	W(15%)	
	Appearance	Visual	No coating defects			T	Each Fittings	W(15%)	
	Non Toxicity	BS 6920	WRAS approval		WRAS Certificate	T	To Check Validity	R	

Prepared By
Incharge -QA

JINDAL FITTINGS LTD TEMBHURNI

Approved By
Head-Quality

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Document No.: JFL/QAP/598 Revision No. : 00 Effective Date : 01.02.2014 Page No. :
	DUCTILE IRON FITTINGS as per BS EN 598 - 2009	

CLIENT NAME:- GENERAL

P.O. NO. :- ----------

P.O. DATE :- ----------

S.No	Inspection Item	Inspection Method	Acceptance criteria	Document	Inspection/Test			Remarks
					Manufacturer		Cust/ TPIA	
					Type	Frequency		
6.2	**External Coating with Fusion Bonded Epoxy (FBE) Coating**							
6.2.1	Surface preparation	Visual	EN 14901 Cl No. 5.2 and 7.1.1 - Sa 2.5	JFL/F/QA/23	T	100%	R	
6.2.2	Appearance	Visual	EN 14901 Cl No. 5.3 and 7.1.2 - Uniform free from pin holes and bubbles	JFL/F/QA/23	T	100%	R	
6.2.3	Adhesion	Punch Separation method (EN ISO 4624)	EN 14901 Cl No. 5.4 and 7.1.3 - Mean Value ≧ 8MPa Minimum Single value ≧ 5MPa	JFL/F/QA/23	T	Once/ThreeMonths	R	
6.2.4	Coating thickness	Non destructive method	EN 14901 Cl No. 5.5 and 7.1.4 - Mean ≧ 250µm (Body)	JFL/F/QA/23	T	1 / Shift	R	
6.2.5	Cross Linkage	MIBK Test	EN 14901 Cl No. 5.6 and 7.1.5 - No deviation against reference test sample	JFL/F/QA/23	T	1 / Shift	R	
7	**Cement Mortar Lining**							
7.1	Cement	Supplier certificate	EN 196-1		T	Each Consignment	R	
7.2	Sand (Grain size distribution & clay contents)	Granulometry	BS EN 598 : 2009 (E) ,Clause 4.4.3.1		T	Each Consignment	R	
7.3	Water	Analysis	Portable Water		T	Yearly	R	
7.4	Sand/Cement ratio	Weighing scale	BS EN 598 : 2009 (E) Clause 4.4.3.1 (S/C≦3.5) / JFL/WI13		T	Each Batch	R	
7.5	CML - No Effect to water quality	BS 6920	WRAS Approval	WRAS Certificate	T	To check validity	R	
7.6	Surface preparation before lining	Visual	BS EN 598 : 2009 (E) ,Clause 4.4.3.2		T	Each Fitting	R	
7.7	Curing	Temperature / Humidity	Natural Curing for 24 Hours		T	Hourly	R	
7.8	Lining thickness	Digital Coat Meter	Table No-4 DN / Thickness (mm) Min / Nom 80 – 300: 2.5 / 4.0 350 – 600: 3.0 / 5.0 700 - 1000: 3.5 / 6.0 1400-2000: 6 / 9.0	JFL/F/QA/06	T	2 Nos/Size/Shift	W(10%)	

Prepared By
Incharge -QA

JINDAL FITTINGS LTD TEMBHURNI

Approved By
Head-Quality

JINDAL FITTINGS LTD Tembhurni, Solapur	QUALITY ASSURANCE PLAN (QAP)	Document No.: JFL/QAP/598 Revision No. : 00 Effective Date : 01.02.2014 Page No. :
	DUCTILE IRON FITTINGS as per BS EN 598 - 2009	

CLIENT NAME:- GENERAL

P.O. NO. :- ----------

P.O. DATE :- ----------

S.No	Inspection Item	Inspection Method	Acceptance criteria	Document	Inspection/Test			Remarks
					Manufacturer		Cust/ TPIA	
					Type	Frequency		
7.9	Lining appearance / Crack Width / Radial displacement	Visual / Feeler gauge	Cracks:- Width DN: 80-300 — Max. width (mm): 0.4 DN: 350-600 — Max. width (mm): 0.5 DN: 700-1200 — Max. width (mm): 0.6 DN: 1400-2000 — Max. width (mm): 0.8	JFL/F/QA/06	T	Each Fitting	W(100%)	
8	**Packing**							
8.1	Appearance	Visual	No damage		T	Each packing	W(100%)	
8.2	Marking on Fittings	Visual	As per BS EN 598 : 2009 (E) clause 4.6 & JFL/SP/18		T	Each Fitting	W(100%)	
9	**EPDM Rubber Gasket**							
9.1	Type of joint	Visual			W	Each delivery	R	
9.2	Packing & marking	Visual	Conformity with purchase order	Test Certificate	W		W(15%)	
9.3	Physical properties	BS EN 681 - 1	BS EN 681 - 1	Test Certificate	T		R	
9.4	Non-toxicity	BS 6920	WRAS Approval	WRAS Certificate	T		R	
9.5	Dimensions & Hardness	Vernier,Pi Tape & Shore A Hardness tester	As per drawing no JFL-PS-STD-52	Test Certificate	T	2Nos / Size / Consignment	R	
10	**Performance test method**							
10.1	1) Leaktightness of joints to positive internal pressure		As per BS EN 598 : 2009 Clause 5.4, 7.0 +/- 0.5 bar for 2 Hrs. No visible leakage.	Test Report witnessed by Third party agency.	W	DN 200, DN 400, DN 800	R	
10.2	a) Joint aligned and subjected to shear							
10.3	b) Joint deflection							
10.4	2) Leaktightness of joints to external pressure		As per BS EN 598 : 2009 Clause 5.5.2, 7.0 +/- 0.1 bar for 2 Hrs. No visible leakage.					
10.5	3) Leaktightness of joints to negative internal pressure		As per BS EN 598 : 2009 Clause 5.5.2, 7.0 +/- 0.09 bar for 2 Hrs.					
10.6	a) Joint aligned and subjected to shear							
10.7	b) Joint deflection							
10.8	4) Leak tightness of joints to cyclic hydraulic pressure		As per BS EN 598 : 2009 Clause 5.5.2, 24000 cycles test pressure between PMA & (PMA-5) Bar and no visual leakage					
10.9	5) Compressive strength of cement mortar		As per BS EN 598 : 2009 Clause 5.10 and Cl No 7.1		W	One test / month	R	

Prepared By
Incharge -QA

JINDAL FITTINGS LTD TEMBHURNI

Approved By
Head-Quality

WRAS - BITUMEN

Our Ref: HL/M110223
Test Report: MAT/LAB 300D

18th August 2011

Deep Industries,
Plot No. 264, GIDC-II,
Dediyasan,
Mehsana 384002,
Gujarat,
India

WATER REGULATIONS ADVISORY SCHEME (WRAS)
MATERIAL APPROVAL

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS 6920-1:2000 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

BITUMINOUS BASED PRODUCTS – SMALL SURFACE SURFACE AREA CONTACT ONLY 5021

Deep High Build Liquid Bitumen Paint. Black coloured, factory applied bituminous coating. For use with water up to 60°C.
Petroleum or asphaltic bitumen, NOT coal tar bitumen. Materials listed in this section are not approved for use for contact with water that is required to be wholesome on large water retaining structures such as lining of pipes, cisterns or water storage tanks.

APPROVAL NUMBER: 1108502
APPROVAL HOLDER: DEEP INDUSTRIES

The Scheme reserves the right to review approval. This approval is valid between August 2011 and August 2016.

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wras.co.uk/directory

Yours faithfully

Jason Furnival
Approvals & Enquiries Manager
Water Regulations Advisory Scheme

Water Regulations Advisory Scheme Ltd.
30 Fern Close, Pen-y-Fan Industrial Estate,
Oakdale, Gwent NP11 3EH, UK.
Tel: 01495 248454. Fax: 01495 236289.
E-mail: info@wras.co.uk Website: www.wras.co.uk

The Water Regulations Advisory Scheme
Registered in England No. 06663930
Registered Office: 1 Queen Anne's Gate
London SW1H 9BT

WRAS - EPOXY

Our Ref: GH/M100299

9th February 2011

WRAS®
Water Regulations Advisory Scheme

Deep Industries
Plot Number 264
GIDC-II
Dediyasan
Mehsana
Gujarat
India
Pin 384002

Dear Sir

WATER REGULATIONS ADVISORY SCHEME
"ITEMS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY - BS 6920"

We refer to your application for the material(s) described below to be approved arising from the results of the tests of effect on water quality that have been carried out on the product(s) so described, it has been decided that there is no objection to its/their use provided the source, nature and manufacturing processes of the ingredients and products are not changed. (See notes overleaf).

COATINGS, PAINTS & LININGS – FACTORY APPLIED PIPE & FITTINGS COATINGS 5030

Deep Guard. Brown, blue and white coloured, airless spray applied, two part epoxy paint. For use with water up to 65°C.

Test Report: MAT/LAB 134C & 400C, 534C/1 and 535C/1.

1006527 **DEEP INDUSTRIES**

An entry, as above, will accordingly be included in the Water Fittings Directory on-line, Part Two, under the section headed, "Materials which have passed full tests of effect on water quality".

Your attention is drawn to the statement overleaf. Manufacturers or applicants may only quote in their sales literature terms which are used in this letter, namely that the product as listed, having passed the tests of effect on water quality, is suitable for use in contact with potable water and that a reference to the product will be included in the Materials section, Part Two, of the Water Fittings Directory on-line: this may be abbreviated to "Water Regulations Advisory Scheme - Approved Material" or "WRAS - Approved Material". **Approval of this product does not signify the approval of its mechanical or physical properties for any use.**

The Technical Committee of the Scheme reserves the right to review approval. This product automatically becomes due for audit reassessment in June 2015.

Yours faithfully

Gareth Harris
WRAS Approvals Administrator
Water Regulations Advisory Scheme

Water Regulations Advisory Scheme Ltd.
30 Fern Close, Pen-y-Fan Industrial Estate,
Oakdale, Gwent NP11 3EH, UK.
Tel: 01495 248454. Fax: 01495 236289.
E-mail: info@wras.co.uk Website: www.wras.co.uk

The Water Regulations Advisory Scheme Ltd
Registered in England No. 06663930
Registered Office: 1 Queen Anne's Gate,
London SW1H 9BT

PRODUCT CONFORMITY CERTIFICATION - GASKET

Kitemark® Licence

No. KM 555689

BSI hereby grants to:

Andhra Polmers Private Limited
Plot No.2
Phase-V
IDA Jeedimetla
Hyderabad
500055
India

In respect of:

BS EN 681-1

Elastomeric seals - Material requirements for pipe joint seals used in water and drainage application

the right and Licence to use the Kitemark in accordance with the Kitemark Licence Conditions of Contract governing the use of the Kitemark, as may be updated from time to time by BSI, and as approved by the Registrar under the Trade Marks Act 1994 (the "Conditions"). All defined terms in this Licence shall have the same meaning as in the Conditions.

The use of the Kitemark is authorized in respect of the Product(s) detailed on this Licence provided at or from the above address.

For and on behalf of BSI:

David Ford, Director, Healthcare and Testing Services

First granted: **16 Oct 2009** Date: **16 Oct 2009** Page: 1 of 2

UKAS PRODUCT CERTIFICATION
003

raising standards worldwide™

This licence remains the property of BSI and shall be returned immediately upon request. This licence does not expire.
To check its validity call +44 (0)8450 765600

WRAS - EPDM GASKET

Our Ref: HL/M1304088
Test Report: MA4920/H section 2

14th March 2014

WRAS
Water Regulations Advisory Scheme

Andhra Polymers Pvt. Ltd.
Plot No. 2,
Phase V,
Ida Jeedimetla,
Hyderabad,
500055,
India

WATER REGULATIONS ADVISORY SCHEME (WRAS)
MATERIAL APPROVAL

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS 6920-1:2000 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

ETHYLENE PROPYLENE DIENE MONOMER (EPDM) - MATERIAL ONLY **5365**

EWA 8180. Black coloured, compression moulded EPDM sheet material. Shore hardness 80. Tested in-radius size 1.16mm. For use with water up to 70°C.

APPROVAL NUMBER: 1403512
APPROVAL HOLDER: ANDHRA POLYMERS PVT. LTD.

The Scheme reserves the right to review approval. This approval is valid between March 2014 and March 2019.

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wras.co.uk/directory

Yours faithfully

Jason Furnival
Approvals & Enquiries Manager
Water Regulations Advisory Scheme

WRAS MATERIAL APPROVAL - MATERIALS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY

The material referred to in this letter is suitable for contact with water for domestic purposes. **Approval of this material does not signify the approval of its mechanical or physical properties for any use.**

Manufacturers or applicants may only quote in their sales literature terms which are used in this letter, namely that; 'the material as listed, having passed the tests of effect on water quality, is suitable for use in contact with wholesome water'

This may be abbreviated to 'Water Regulations Advisory Scheme - Approved Material' or 'WRAS Approved Material'.

The scope of an Approval does not extend to rebranded materials unless otherwise agreed by the Scheme.

Use of the WRAS Approved Material Logo

The WRAS Approved Material logo is registered under the Trade Marks Acts 1994

Approval holders may use the WRAS Approved Material logo and make reference to any approval issued by WRAS Ltd. in respect of a particular material or range of materials provided the approval is, and remains valid.

Approval holders are entitled to use the logo on the packing, promotional literature and point of sale advertising Approved Materials.

Modifications to existing Approvals

It is a condition of WRAS Material Approval that **NO** changes or modifications to the Approved Material, be made without the Approval Holder first notifying WRAS Ltd. Full details of the proposed changes must be provided to the Scheme. Failure to comply with this condition will immediately invalidate a previously granted Approval.

Re-Approval

WRAS will write to you 1 year before the approval expires asking whether you would like to renew it. Please complete the relevant section of the MA3 application form which will be included with the letter and return to WRAS (via e-mail or post).

Please note it is the responsibility of the Approval Holder to ensure the Approval remains valid. WRAS Ltd. accepts no liability for the delay in granting approval where this is caused by circumstances outside of the Scheme's control.

Our Ref: NJ/M1304118
Test Report: MA4666/M &
LGC/WAT/2013/026

13th January 2014

WRAS®
Water Regulations Advisory Scheme

Andhra Polymers Pvt. Ltd
Plot No 2, Phase V
IDA Jeedimetla
Hyderabad
500 055
Andhrapradesh
India

WATER REGULATIONS ADVISORY SCHEME (WRAS)
MATERIAL APPROVAL

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS 6920-1:2000 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

RUBBERS - ETHYLENE PROPYLENE DIENE MONOMER (EPDM) - MATERIAL ONLY **5365**

EWA12155 (EP53) (Shore hardness 55A), EWA12160 (Shore hardness 60A), EWA12165 (EW65 2GS) (Shore hardness 65A), EWA12170 (WRC 70) (Shore hardness 70A) & EWA12180 (EW80) (Shore hardness 80A). Black coloured, compression moulded, EPDM Rubber sheet material. Test in-radius size 1.00mm. For use with water up to 23°C.
EWA12150 (EW48) (Shore hardness 50A). Black coloured, compression moulded, EPDM Rubber sheet material. Test in-radius size 1.00mm. For use with water up to 70°C.

APPROVAL NUMBER: 1301552
APPROVAL HOLDER: ANDHRA POLYMERS PVT. LTD

The Scheme reserves the right to review approval. This approval is valid between January 2013 and January 2018.

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wras.co.uk/directory

Yours faithfully

Jason Furnival
Approvals & Enquiries Manager
Water Regulations Advisory Scheme

Water Regulations Advisory Scheme Ltd,
30 Fern Close, Pen-Y-Fan Industrial Estate
Oakdale, Gwent, NP11 3EH
Tel: +44 (0) 333 207 9030. Fax: +44 (0) 1495 248 540
Email: info@wras.co.uk. Website: www.wras.co.uk

The Water Regulations Advisory Scheme Ltd
Registered in England No. 05663930
Registered Office: 13 Newby Road,
Hazel Grove, Stockport, Cheshire, SK7 5DA

WRAS MATERIAL APPROVAL - MATERIALS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY

The material referred to in this letter is suitable for contact with water for domestic purposes. **Approval of this material does not signify the approval of its mechanical or physical properties for any use.**

Manufacturers or applicants may only quote in their sales literature terms which are used in this letter, namely that; 'the material as listed, having passed the tests of effect on water quality, is suitable for use in contact with wholesome water'

This may be abbreviated to 'Water Regulations Advisory Scheme - Approved Material' or 'WRAS Approved Material'.

The scope of an Approval does not extend to rebranded materials unless otherwise agreed by the Scheme.

Use of the WRAS Approved Material Logo

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Approval holders may use the WRAS Approved Material logo and make reference to any approval issued by WRAS Ltd. in respect of a particular material or range of materials provided the approval is, and remains valid.

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Re-Approval

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Please note it is the responsibility of the Approval Holder to ensure the Approval remains valid. WRAS Ltd. accepts no liability for the delay in granting approval where this is caused by circumstances outside of the Scheme's control.

QUALITY SYSTEM MANUAL FOR GASKETS

CERTIFICATE

TÜV NORD

Management system as per
ISO 9001 : 2008

In accordance with TÜV INDIA procedures, it is hereby certified that

ANDHRA POLYMERS PVT. LTD.
Plot No. 2, Phase V, IDA Jeedimetla,
Hyderabad - 500 055,
India

applies a quality management system in line with the above standard for the following scope

Manufacture and Supply of Grooved Rubber Sole Plates/ Composite Grooved Rubber Sole Plates (Rail Pads), Rubber Rings (Duct and Pipe Seals), Rubber to Metal Bonded Products and Rubber Compound Sheets for Domestic and Export Market

Certificate Registration No. **QM 06 00025**
Audit Report No. **Q 457/2005**

Valid until **30.08.2017**
Valid from **31.08.2014**
Initial Certification **19.09.2005**

S.K.Kulka

Certification Body
at TÜV INDIA PVT. LTD.

Issue **28.08.2014**
Place : **Mumbai**

This certification was conducted in accordance with the TÜV INDIA auditing and certification procedures and is subject to regular surveillance audits.

TUV India Pvt. Ltd., 801, Raheja Plaza – 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuvindia.co.in

TÜV INDIA NABCB QM 002

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF