به نام خدا

مرکز دانلود رایگان
مهندسی متالورژی و مواد

www.Iran-mavad.com

A brief introduction to

Material Inspection at Site

Date: 05 June 2014

Prepared by: Pedram Esmaeilzadeh

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l. Material Traceability

Outcome/Objectives

- How to inspect the incoming material as per related project requirements
- What type of documents to be reviewed and archived
- Concept of Material traceability

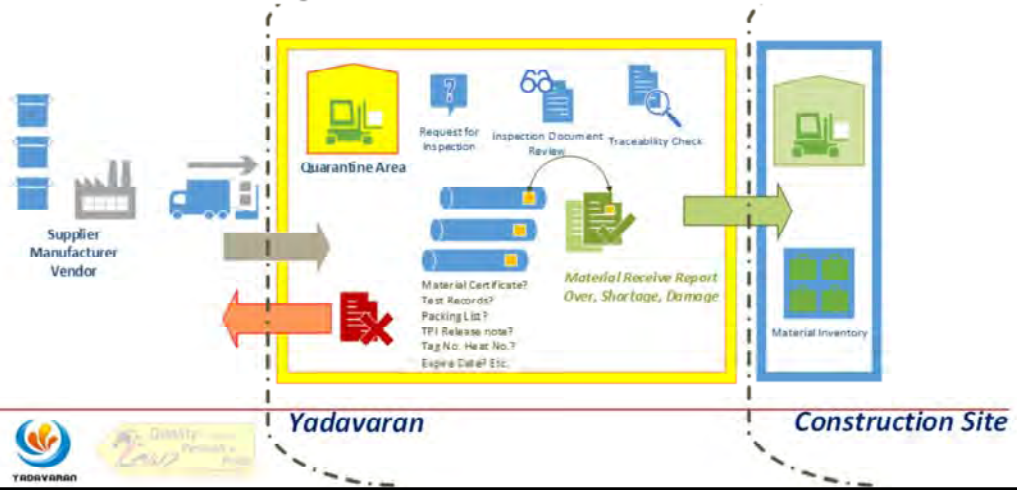
- **This knowledge sharing material is not an official instruction to project parties**

To know how to inspect the incoming material as per related project requirements
To get familiar with common materials used in the project, especially metallic parts
To understand the concept of Material traceability (in documentation and construction)

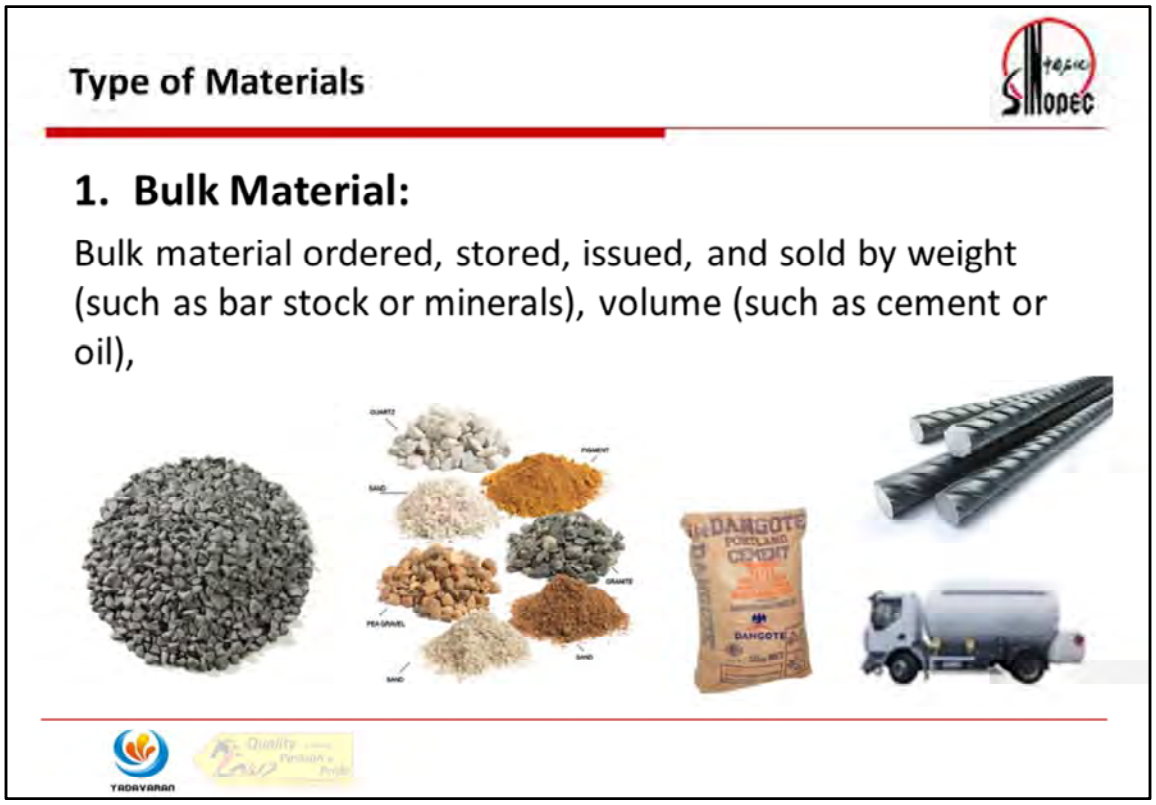
Note:
This material is prepared by the facilitator for an internal Knowledge Sharing session for SIPC Yadavaran Project Surface Facility Construction Department based on the related approved procedures and applicable standards. This material will not replace the related Project Documents/Standards and can not be referred as official instruction/reference to project parties.

Scope

- During Manufacturing Shop,
- **During fabrication or construction (incoming material)**
- After installation, e.g. for maintenance



Note:
Material Definition in this knowledge sharing is extended only to all type of incoming material to site



Civil Raw Materials

The typical civil raw materials are as follows:

Rebar

As per Iranian regulation rebar shall be supplied from a qualified mill/manufacturer approved by ISIRI.

For rebar inspection following step shall be done;

Manufacturer shall be approved by ISIRI requirements.

Mill test certificate issued by the manufacturer shall be checked as per project requirements/AFC drawings. (E.g. type, size, etc…)

Visual inspection, dimension and condition (corrosion, damage, storage condition)

Taking sample as per Iranian regulation and send to a qualified laboratory for test as per standard/Iranian regulation. (TPA shall select the sample)

Recording and signing the related incoming material inspection report if all above mentioned step was satisfactory.

Cement

Following step shall be done;

2.1. Manufacturer shall be approved by ISIRI requirements.

2.2. Cement factory certificate shall be checked against the project requirements/AFC drawings.

2.3. Cement expire date shall be valid and passed to the construction schedule.

2.4. Taking sample as per Iranian regulation and send to a qualified laboratory for test as per standard/Iranian regulation. (TPA shall select the sample)

2.5. Recording and signing the related incoming material inspection report if all above mentioned step was satisfactory.

Sand and gravel:

Sand and gravel source shall be approved by SIPC supervision team. (Periodical inspection shall be arranged from the source by supervision team)

Each shipment shall be tested by the residence qualified laboratory before use. (the new shipment cannot be mixed with existing approved raw material unless the test result is approved officially)

All the test results shall be checked again the project requirements and approved Mix design.

Notes:

For rebar, the related inspection documents shall be traceable. (The heat number mentioned on the mill test certificate and on the bundle tag shall be the same. Also the project name, EPCC contractor name and material heat number etc. shall be mentioned on the laboratory test report.

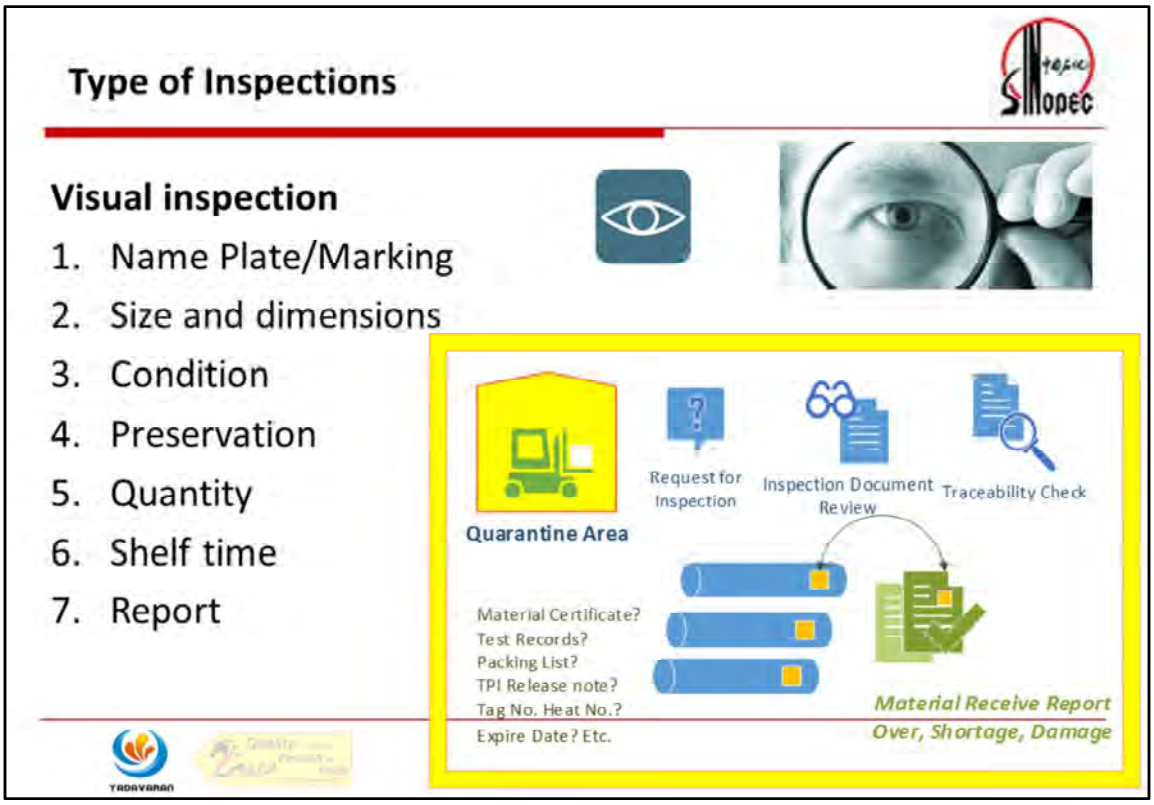
A Test Frequency and reference table shall be prepared for each package.

Type of Material

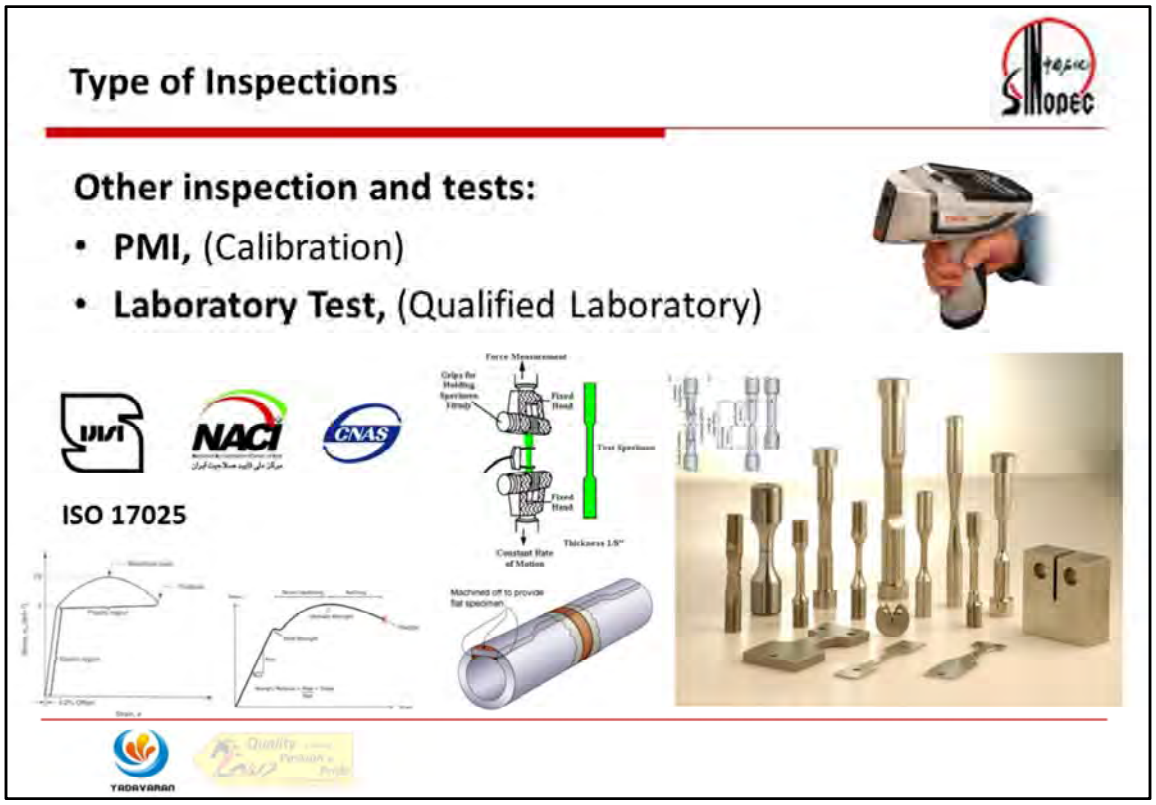
2. Itemized Standard Products (Pipes and Fittings, Cables, etc.)

off-the-shelf

3. Especial Equipment



Positive Material Identification (PMI) is the analysis of a metallic alloy to establish composition by reading the quantities by percentage of its constituent elements. Typical methods for PMI include X-ray fluorescence (XRF) and optical emission spectrometry (OES).



Positive Material Identification (PMI) is the analysis of a metallic alloy to establish composition by reading the quantities by percentage of its constituent elements. Typical methods for PMI include X-ray fluorescence (XRF) and optical emission spectrometry (OES).

Qualified Laboratory

A laboratory which is qualified as per National/International regulations or approved by Client

ISO/IEC 17025

General requirements for the competence of testing and calibration laboratories

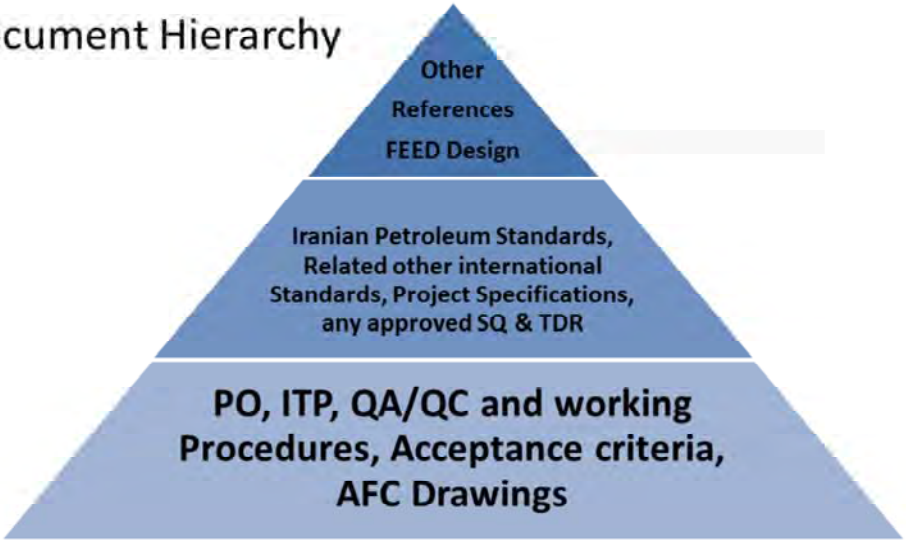
Inspection Document Review

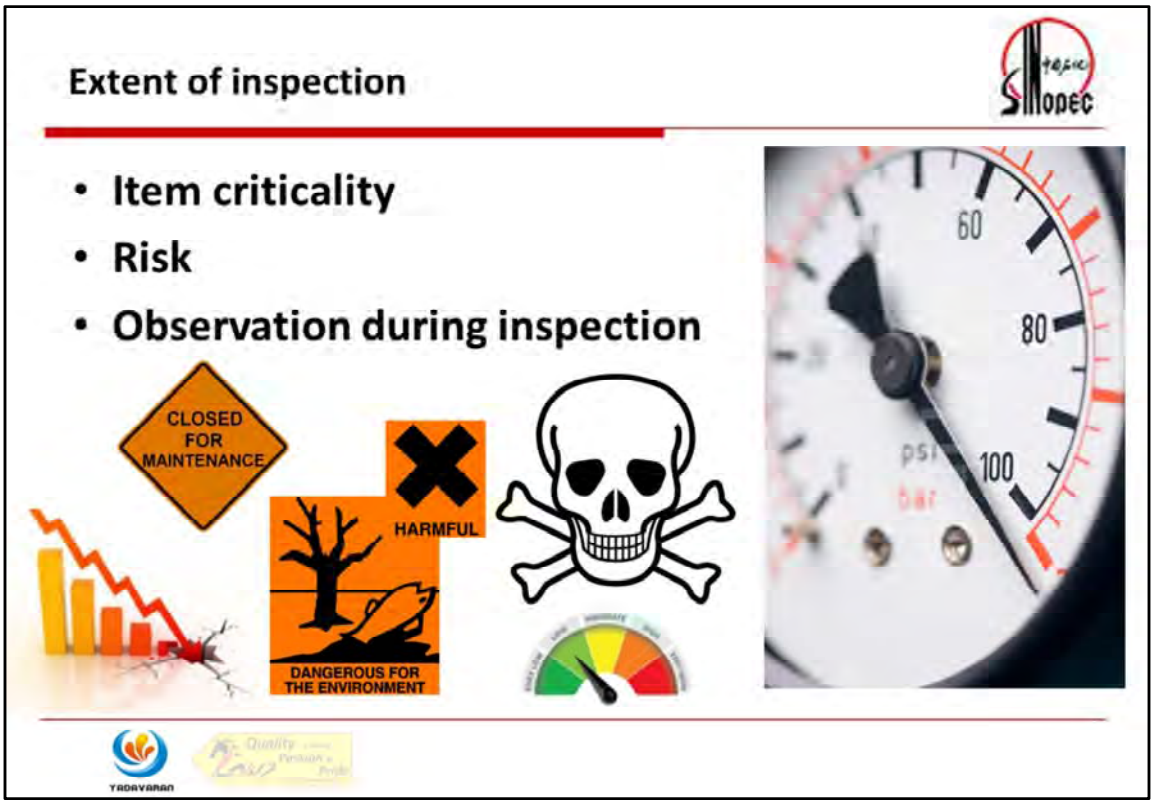
- PO, TR
- Reference documents AFC & latest revision
- SPEC
- Datasheet
- PMS
- MTO
- Material inventory (Use/purpose)

Product specification:
Complete detailed technical requirements relevant for the order, stated in written form e.g. referenced regulations, standards and other specifications

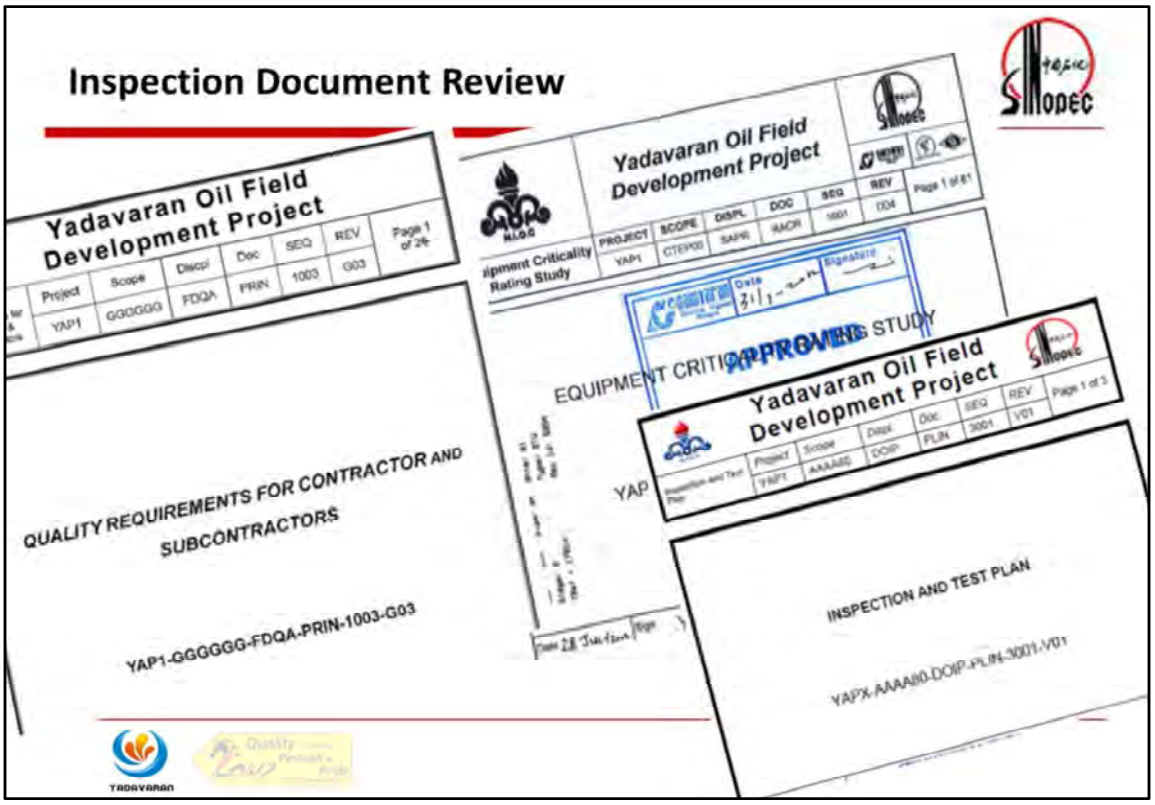
Inspection Document Review

- Document Hierarchy





The extent of inspection is related to the item criticality and Risk. The criticality rating of the equipment for each package is mentioned in a document with the same name “criticality rating”. Also, service fluid, working pressure/temperature, location, etc. shall be considered.



Related ITP

Quality Requirements for Contractor and Subcontractors YAP1-GGGGGG-FDQA-PRIN-1003

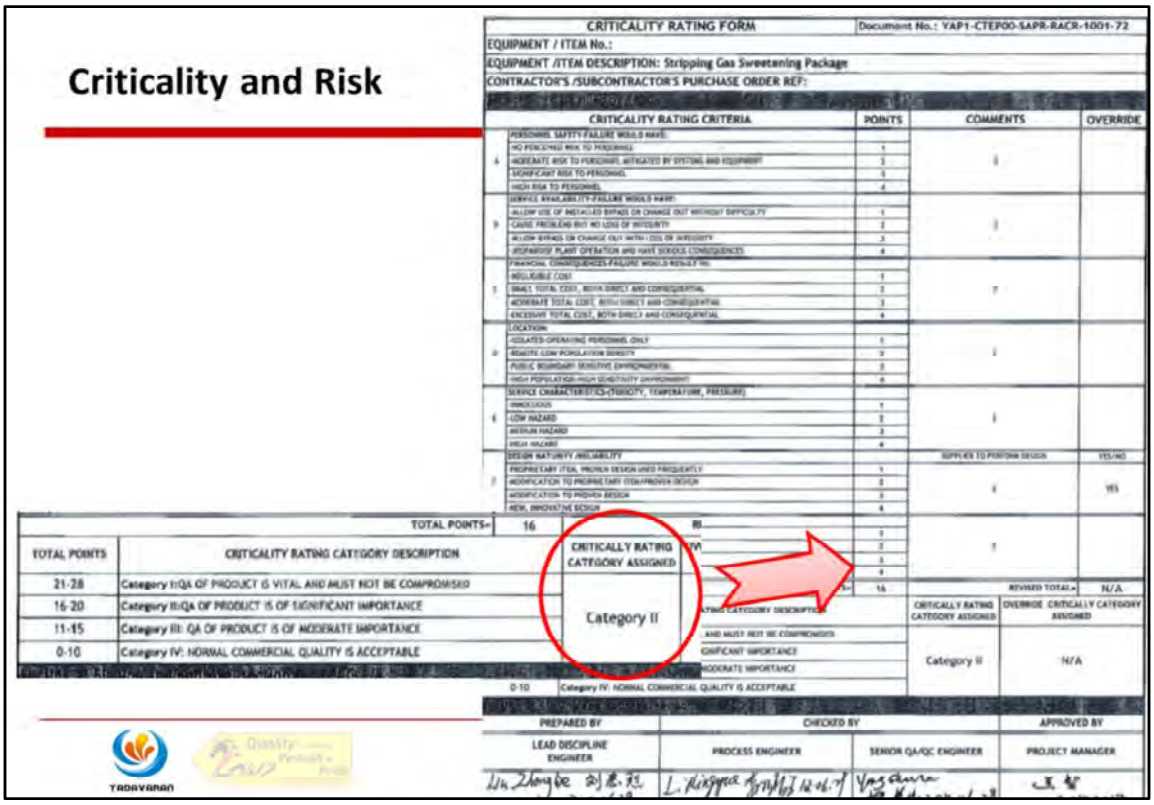
Equipment Criticality Rating for CTEP YAP1-CTEP00-SAPR-RACR-1001

Criticality Rating

Quality Requirements for Contractor and Subcontractors definition
YAP1-GGGGGG-FDQA-PRIN-1003

Criticality	Rating
Vital	I
Significant Importance	II
Moderate Importance	III
Standard Commercial Quality	IV

Criticality and Risk



CRITICALITY RATING FORM — Document No.: YAP1-CTEP00-SAPR-RACR-1001-72

EQUIPMENT / ITEM No.:

EQUIPMENT /ITEM DESCRIPTION: Stripping Gas Sweetening Package

CONTRACTOR'S /SUBCONTRACTOR'S PURCHASE ORDER REF:

	CRITICALITY RATING CRITERIA	POINTS	COMMENTS	OVERRIDE
A	PERSONNEL SAFETY-FAILURE WOULD HAVE:			
	NO PERCEIVED RISK TO PERSONNEL	1		
	MODERATE RISK TO PERSONNEL, MITIGATED BY SYSTEMS AND EQUIPMENT	2		
	SIGNIFICANT RISK TO PERSONNEL	3		
	HIGH RISK TO PERSONNEL	4		
B	SERVICE AVAILABILITY-FAILURE WOULD HAVE:			
	ALLOW USE OF INSTALLED BYPASS OR CHANGE OUT WITHOUT DIFFICULTY	1		
	CAUSE PROBLEMS BUT NO LOSS OF INTEGRITY	2		
	ALLOW BYPASS OR CHANGE OUT WITH LOSS OF INTEGRITY	3		
	JEOPARDIZE PLANT OPERATION AND HAVE SERIOUS CONSEQUENCES	4		
C	FINANCIAL CONSEQUENCES-FAILURE WOULD RESULT IN:			
	NEGLIGIBLE COST	1		
	SMALL TOTAL COST, BOTH DIRECT AND CONSEQUENTIAL	2		
	MODERATE TOTAL COST, BOTH DIRECT AND CONSEQUENTIAL	3		
	EXCESSIVE TOTAL COST, BOTH DIRECT AND CONSEQUENTIAL	4		
D	LOCATION:			
	ISOLATED-OPERATING PERSONNEL ONLY	1		
	REMOTE-LOW POPULATION DENSITY	2		
	PUBLIC BOUNDARY SENSITIVE ENVIRONMENTAL	3		
	HIGH POPULATION-HIGH SENSITIVITY ENVIRONMENT	4		
E	SERVICE CHARACTERISTICS-(TOXICITY, TEMPERATURE, PRESSURE):			
	INNOCUOUS	1		
	LOW HAZARD	2		
	MEDIUM HAZARD	3		
	HIGH HAZARD	4		
F	DESIGN MATURITY /RELIABILITY		SUPPLIER TO PERFORM DESIGN	YES/NO
	PROPRIETARY ITEM, PROVEN DESIGN USED FREQUENTLY	1		
	MODIFICATION TO PROPRIETARY ITEM/PROVEN DESIGN	2	1	YES
	MODIFICATION TO PROVEN DESIGN	3		
	NEW, INNOVATIVE DESIGN	4		
	TOTAL POINTS=	16		

TOTAL POINTS	CRITICALITY RATING CATEGORY DESCRIPTION
21-28	Category I:QA OF PRODUCT IS VITAL AND MUST NOT BE COMPROMISED
16-20	Category II:QA OF PRODUCT IS OF SIGNIFICANT IMPORTANCE
11-15	Category III: QA OF PRODUCT IS OF MODERATE IMPORTANCE
0-10	Category IV: NORMAL COMMERCIAL QUALITY IS ACCEPTABLE

CRITICALLY RATING CATEGORY ASSIGNED: Category II

		REVISED TOTAL=	N/A
		CRITICALLY RATING CATEGORY ASSIGNED	OVERRIDE CRITICALLY CATEGORY ASSIGNED
		Category II	N/A

PREPARED BY	CHECKED BY		APPROVED BY
LEAD DISCIPLINE ENGINEER	PROCESS ENGINEER	SENIOR QA/QC ENGINEER	PROJECT MANAGER

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Criticality Rating

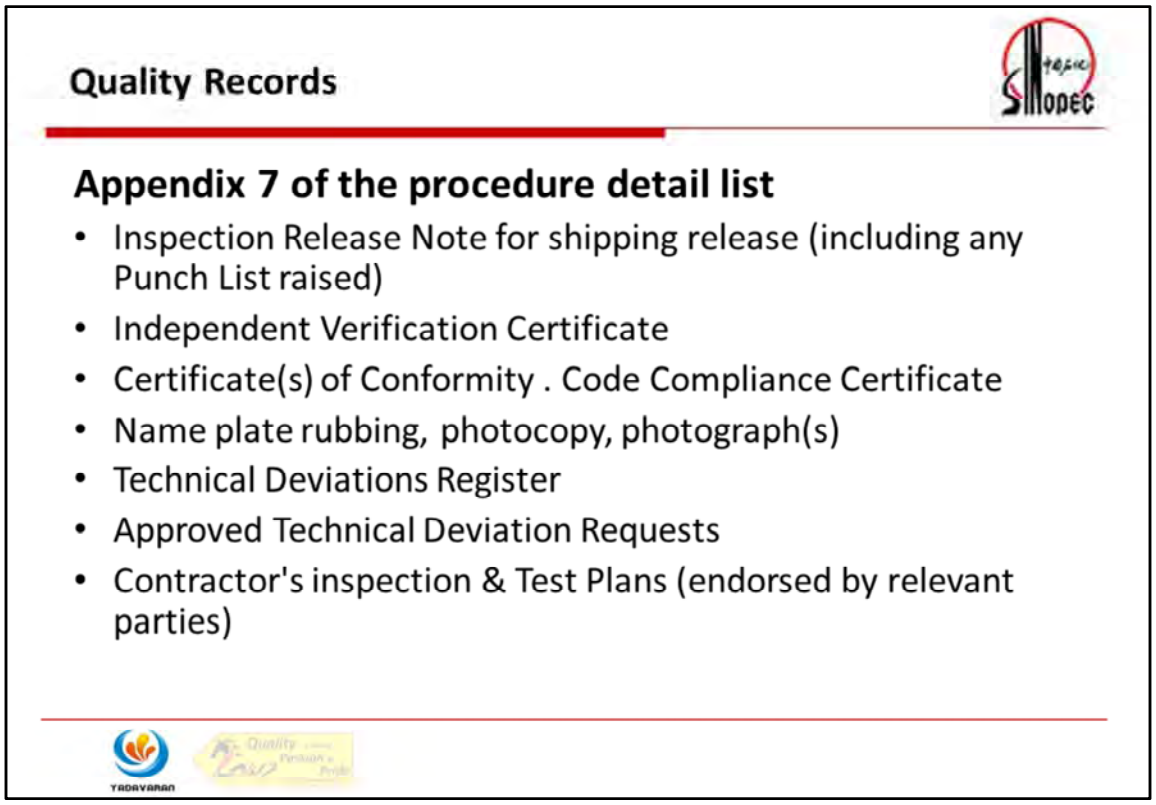
Contractor Quality Requirements Based Upon Criticality Rating	Criticality Rating			
C –During the execution of the scope of Work	I	II	III	IV
C3. Performance Records				
C3. NCR Corrective and Preventive actions to be **APPROVED** by COMPANY (See Note 7)	√	√		
C4. Copies of audit reports and Corrective Action Requests to be submitted to COMPANY for review (see Note 6)	√	√	√	
C5. FAT Report shall be submitted to COMPANY for review (Note 21)	√	√	√	
C6. Outstanding Work List to be submitted to COMPANY for review (see Note 17)	√	√	√	
C7. Inspection Release Note to be submitted to COMPANY for review (see Note 17)	√	√	√	
C8. Manufacturing / Certification Data Book to be **APPROVED** by COMPANY (see Note 18)	√	√	√	

Note 7:
The Contractor shall forward a copy of all Non Conformance Reports (NCRs) issued either by Contractor, Subcontractors and Vendors.
The Contractor shall develop and Implement a NCR register that is issued to COMPANY at the end of every month. The NCR register shall list all the NCRs issued, the status of NCR action and make reference any Technical Deviation Requests that may have been issued to close the NCR.

Note 17:
The Contractor shall issue an inspection Release Note (IRN) (refer to Appendix 5) prior to the shipment of the product. If the product is incomplete in any way, the Contractor shall attach a list of incomplete work to the IRN (refer to Appendix 9), but shipment of incomplete products shall be subject to COMPANY'S approval. The Contractor shall issue a Certificate of Conformity (refer to Appendix 6) to accompany the IRN.

Note 18:
The Contractor shall develop the format of Manufacturing / Certification Data Book and submit to COMPANY for approval. Contractor shall obtain COMPANY approval at least seven (7) days in advance of first inspection activity. Details of the minimum contents of the Manufacturing / Certification Data Book shall be as per Appendix 7 and other requirements of the Contract. The Contractor shall compile the Manufacturing / Certification Data Book in the approved format and submit to COMPANY for approval on completion of the Work.

Note 21:
The Contractor shall issue the FAT Report to COMPANY within seven (7) days of completion of FAT testing.



Other relevant items;
Subcontractor's and Vendor's inspection &Test Plans (endorsed by relevant parties)
Index of material and fabrication certificates (cross referenced to package component)
Material and welding location drawing . Material test certification, including impact test and NACE compliance
Approved welding procedures
Approved production procedures . Approved NDE procedures
Welders qualifications
NDE location drawing
NDE operators qualifications
NDE reports
Heat treatment procedures . Heat treatment reports and charts
Copies of material certificates for items to be welded at site
Contractor's inspection & Test Plans (endorsed by relevant parties)
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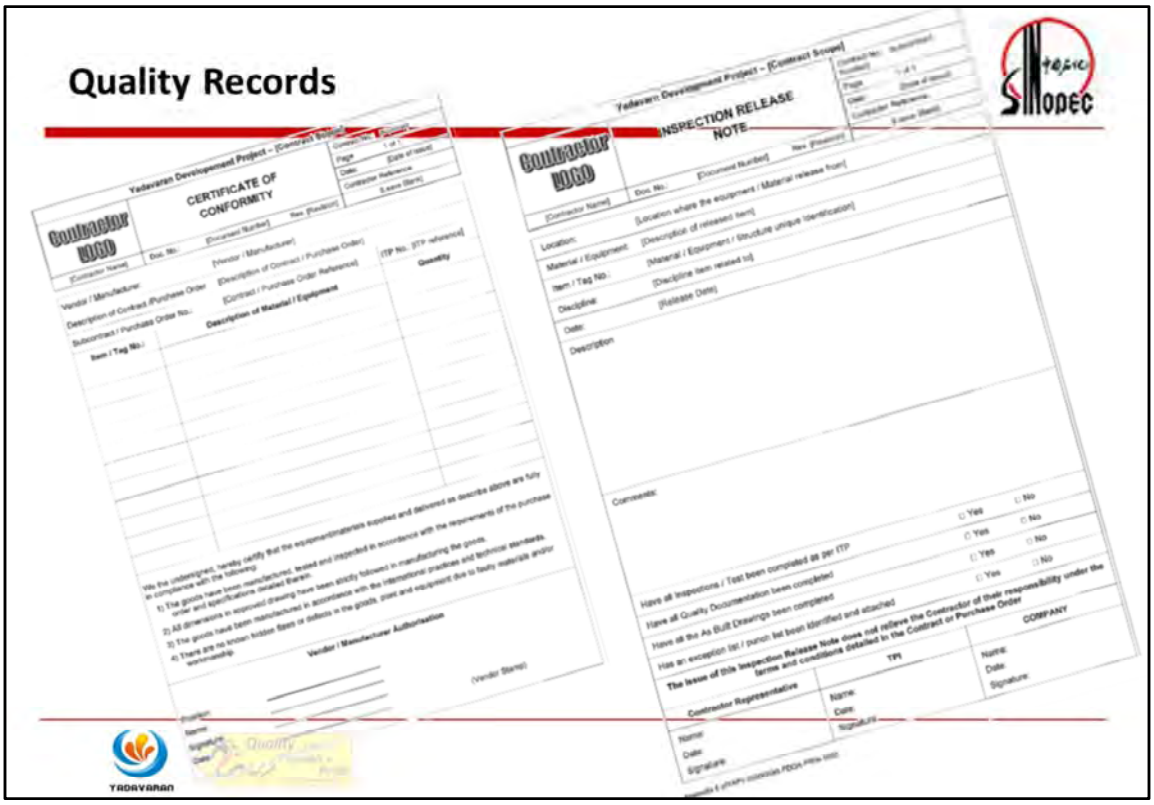
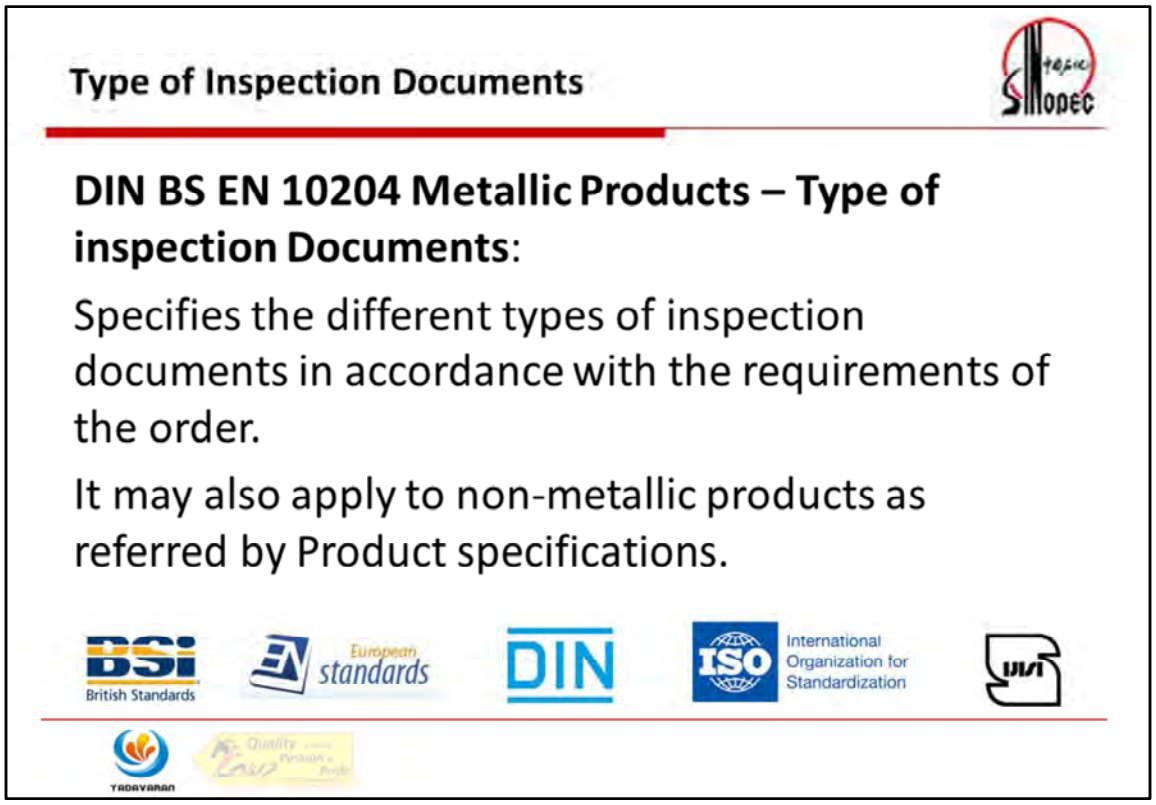

Quality Records
Yadavaran Development Project – [Contract Scope]
CERTIFICATE OF CONFORMITY
Contractor LOGO
INSPECTION RELEASE NOTE
TADAVARAN

Open Package Inspection

- **Incoming Material Inspection Report**

The incoming material inspection report format shall be completed, signed and stamped by Third Party Inspector.

Any over, shortage, damage or wrong material shall be reported.



BS EN 10204 Metallic Products – Type of inspection Documents

In order to trace the history of the material, reference to the inspection documents must be made. BS EN 10204 Metallic products - Types of inspection documents is the standard, which provides guidance on these types of document.

1. This document specifies the different types of inspection documents supplied to the purchaser, in accordance with the requirements of the order, for the delivery of all metallic products (e.g. plate, sheet. bars, forgings, castings), whatever their method of production.
2. This document may also apply to non-metallic products.
3. This document is used in conjunction with the product specifications which specify the technical delivery
conditions of the products.

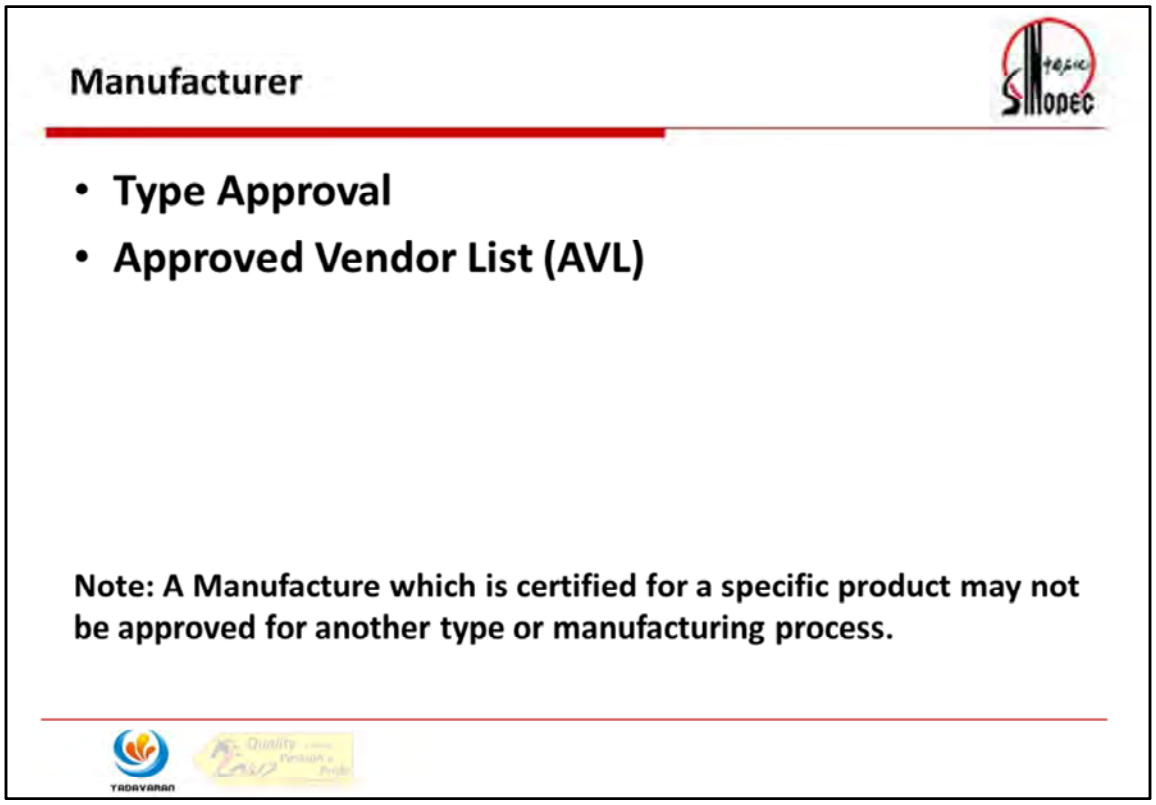
ISO 10474

Type of inspection Documents

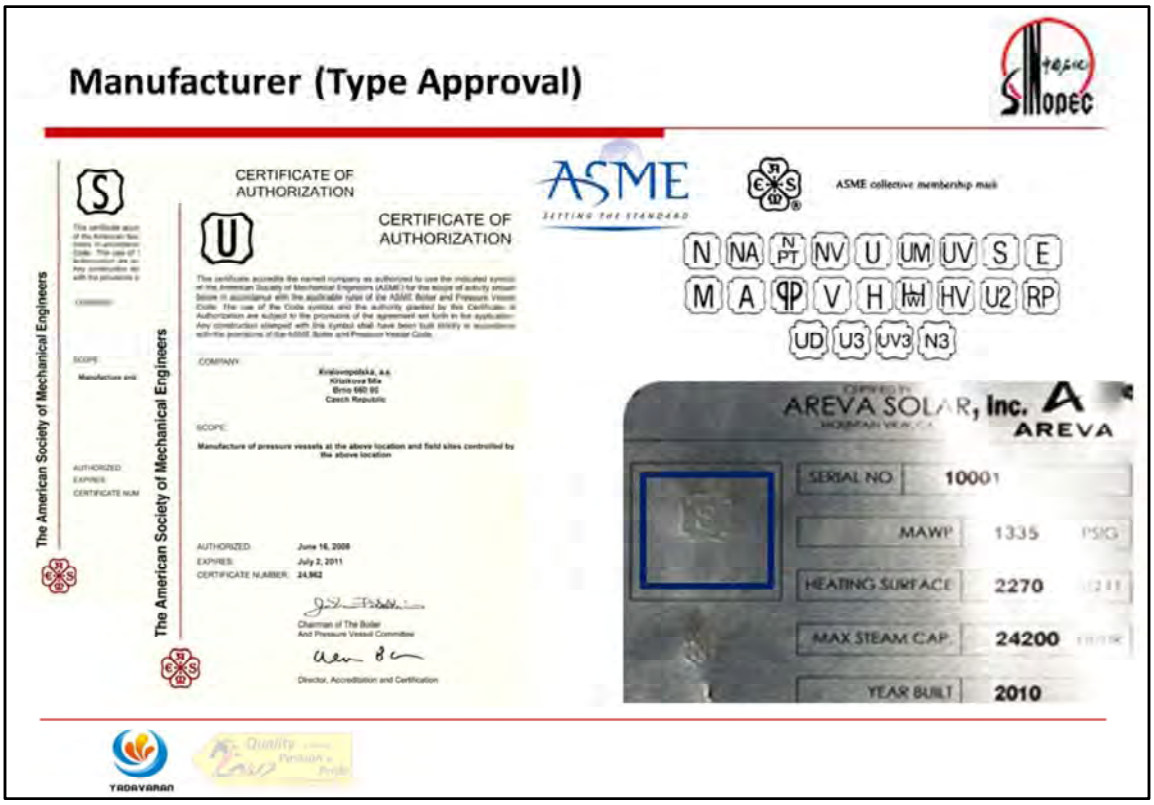
	Document Type	Document Content	Document Validity by
Type 2.1	Declaration of compliance with the order	Statement of compliance with the order	The manufacturer
Type 2.2	Test Report	Statement of compliance with the order, with indication of results of non-specific inspection	The manufacturer
Type 3.1	Inspection Certificate 3.1	Statement of compliance with the order, with indication of results of specific inspection	The manufacturer authorized inspection representative independent of the manufacturer department
Type 3.2	Inspection Certificate 3.2	Statement of compliance with the order, with indication of results of specific inspection	The manufacturer authorized inspection representative independent of the manufacturer department and either the purchaser's authorized inspection representative or the inspector designated by the official regulations

Type 2.1 : Declaration of compliance with the order
Document in which the manufacturer declares that the products supplied are in compliance with the requirements of the order, without inclusion of test results.
Type 2.2 : Test report
Document in which the manufacturer declares that the products supplied are in compliance with the requirements of the order and in which he supplies test results based on non-specific inspection.
Type 3.1: Inspection certificate
Document issued by the manufacturer in which he declares that the products supplied are in compliance with the requirements of the order and in which he supplies test results.
The test unit and the tests to be carried out are defined by the product specification, the official regulation and corresponding rules and/or the order.

The document is validated by the *manufacturer's authorized inspection representative, independent of the manufacturing department*.
Type 3.2: Inspection certificate
Document prepared by both the *manufacturer's authorized inspection representative, independent of the manufacturing department* and either the *purchaser's authorized inspection representative* or the *inspector designated by the official regulations* and in which they declare that the products supplied are in compliance with the requirements of the order and in which test results are supplied.
Non-specific inspection
Inspection carried out by the manufacturer in accordance with his own procedures to assess whether products
defined by the same product specification and made by the same manufacturing process, are in compliance with
the requirements of the order or not.
The products inspected are not necessarily the products actually supplied
Specific inspection
Inspection carried out, before delivery, according to the product specification, on the products to be supplied or on test units of which the products supplied are part, in order to verify that these
products are in compliance with the requirements of the order.



Type Approval or **Certificate of Conformity** is granted to a product that meets a minimum set of regulatory, technical and safety requirements. Generally, type approval is required before a product is allowed to be sold in a particular country, so the requirements for a given product will vary around the world.



A – FIELD ASSEMBLY OF POWER BOILERS
E – ELECTRIC BOILERS
H – HEATING BOILERS, STEEL PLATE OR CAST IRON SECTIONAL
HV – HEATING BOILER SAFETY VALVES
HLW – LINED POTABLE WATER HEATERS
M – MINIATURE BOILERS
N – NUCLEAR POWER PLANT COMPONENTS
NPT – NUCLEAR POWER PLANT COMPONENT PARTIALS
NA – NUCLEAR POWER PLANT INSTALLATION/ ASSEMBLY
NV – NUCLEAR POWER PLANT SAFETY VALVES
PP – PRESSURE PIPING
RP – REINFORCED PLASTIC PRESSURE VESSELS
RTP – REINFORCED THERMOSET PLASTIC CORROSION RESISTANT EQUIPMENT
S – POWER BOILERS
U,U2,U3 – PRESSURE VESSELS
UD – RUPTURE DISC DEVICES
UM – MINIATURE PRESSURE VESSELS
UV – PRESSURE VESSEL SAFETY VALVES
UV3 – HIGH PRESSURE VESSEL SAFETY VALVES
V – BOILER SAFETY VALVES

Manufacturer

Certificate of Authority to use the Official API Monogram

License Number: 6D-0285 ORIGINAL

NEWAY VALVE (SUZHOU) CO., LTD.
No. 999 Xiang Jiang Road
Suzhou New District
Suzhou, Jiangsu
People's Republic of China

API Spec 6D

6D-0285

The scope of this license includes the following product: Ball Valves

QMS Exclusions: No Exclusions Identified as Applicable

Effective Date: JUNE 22, 2007
Expiration Date: JUNE 22, 2010

Director of Certification Programs

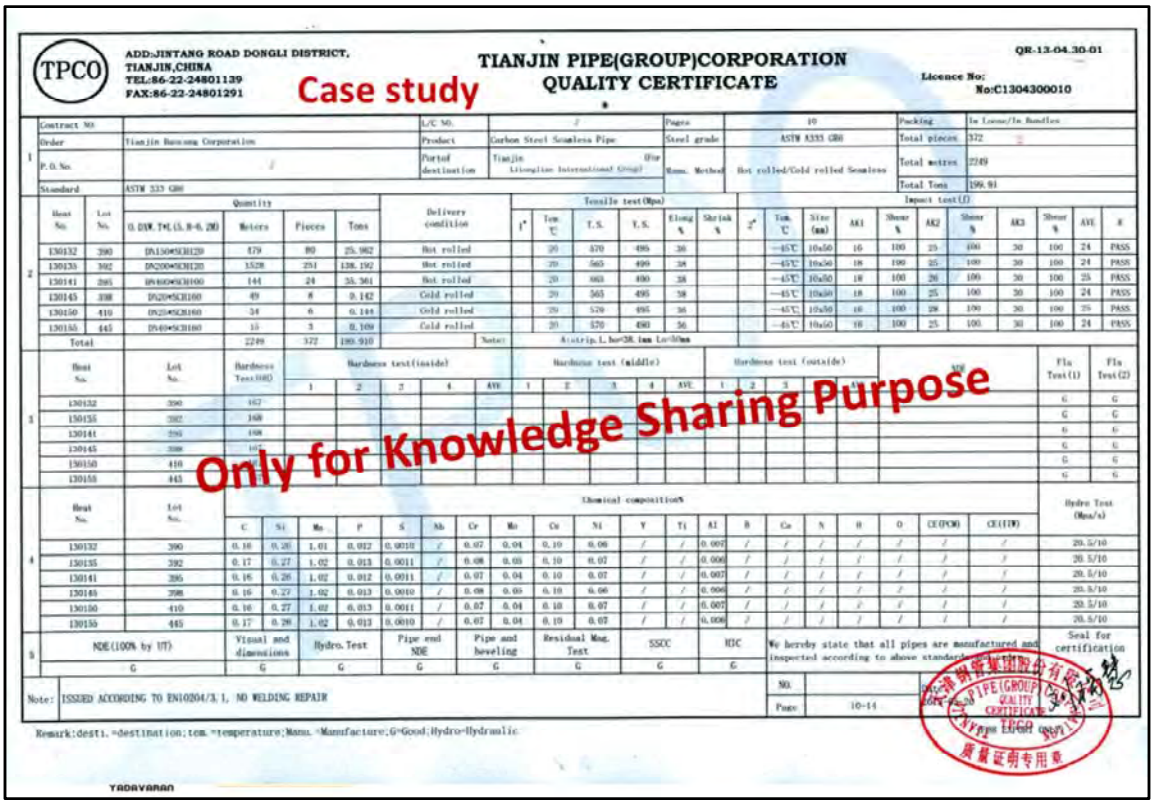
American Petroleum Institute

energy API

American Petroleum Institute

Case study

How to Review Carbon Steel seamless pipe inspection certificate?



ADD:JINTANG ROAD DONGLI DISTRICT,
TIANJIN,CHINA
TEL:86-22-24801139
FAX:86-22-24801291

Case study

TIANJIN PIPE(GROUP)CORPORATION
QUALITY CERTIFICATE

QR-13.04.30-01

Licence No:
No:C1304300010

Contract NO.		L/C NO.	/	Pages	10	Packing	In Loose/In Bundles
Order	Tianjin Baosteel Corporation	Product	Carbon Steel Seamless Pipe	Steel grade	ASTM A333 GR6	Total pieces	372
P. O. No.	/	Portof destination	Tianjin (For Lianyungang International Group)	Manu. Method	Hot rolled/Cold rolled Seamless	Total metres	2249
Standard	ASTM 333 GR6					Total Tons	199.91

Heat No.	Lot No.	Quantity: O. DIM. T*L (5. 8-6. 2M)	Meters	Pieces	Tons	Delivery condition	Tensile test(Dpa): 1*	Tem. ℃	T.S.	Y.S.	Elong %	Shrink %	2*	Tem. ℃	Size (mm)	AK1	Shear %	AK2	Shear %	AK3	Shear %	AVE	#
130132	390	DN150*SCH120	579	80	25.962	Hot rolled		20	570	405	36			-45℃	10x50	16	100	25	100	30	100	24	PASS
130135	392	DN200*SCH120	1528	251	138.192	Hot rolled		20	565	409	38			-45℃	10x50	18	100	25	100	30	100	24	PASS
130141	395	DN600*SCH100	144	24	35.361	Hot rolled		20	563	400	38			-45℃	10x50	18	100	26	100	30	100	25	PASS
130145	398	DN20*SCH160	49	8	0.142	Cold rolled		20	565	405	38			-45℃	10x50	18	100	25	100	30	100	24	PASS
130150	410	DN25*SCH160	34	6	0.144	Cold rolled		20	570	405	36			-45℃	10x50	16	100	28	100	30	100	25	PASS
130155	445	DN40*SCH160	15	3	0.109	Cold rolled		20	570	400	36			-45℃	10x50	16	100	25	100	30	100	24	PASS
Total			2249	372	199.910		Note:	A:strip, L, b=38. Lan L=50mm															

Heat No.	Lot No.	Hardness Test(HB)	Hardness test(inside) 1	2	3	4	AVE	Hardness test (middle) 1	2	3	4	AVE	Hardness test (outside) 1	2	3	4	AVE	Flu Test(1)	Flu Test(2)
130132	390	167																G	G
130135	392	168																G	G
130141	395	168																G	G
130145	398	167																G	G
130150	410																	G	G
130155	445																	G	G

Heat No.	Lot No.	Chemical composition% C	Si	Mn	P	S	Nb	Cr	Mo	Cu	Ni	V	Ti	Al	B	Ca	N	H	O	CE(IIW)	CE(Pcm)	Hydro Test (Mpa/s)
130132	390	0.16	0.26	1.01	0.012	0.0010	/	0.07	0.04	0.10	0.06	/	/	0.007	/	/	/	/	/	/	/	20.5/10
130135	392	0.17	0.27	1.02	0.013	0.0011	/	0.08	0.05	0.10	0.07	/	/	0.006	/	/	/	/	/	/	/	20.5/10
130141	395	0.16	0.26	1.02	0.012	0.0011	/	0.07	0.04	0.10	0.07	/	/	0.007	/	/	/	/	/	/	/	20.5/10
130145	398	0.16	0.27	1.02	0.013	0.0010	/	0.08	0.05	0.10	0.06	/	/	0.006	/	/	/	/	/	/	/	20.5/10
130150	410	0.16	0.27	1.02	0.013	0.0011	/	0.07	0.04	0.10	0.07	/	/	0.007	/	/	/	/	/	/	/	20.5/10
130155	445	0.17	0.26	1.02	0.013	0.0010	/	0.07	0.04	0.10	0.07	/	/	0.006	/	/	/	/	/	/	/	20.5/10

NDE(100% by UT)	Visual and dimensions	Hydro. Test	Pipe end NDE	Pipe end beveling	Residual Mag. Test	SSCC	HIC
G	G	G	G	G	G	G	G

We hereby state that all pipes are manufactured and inspected according to above standard requirements

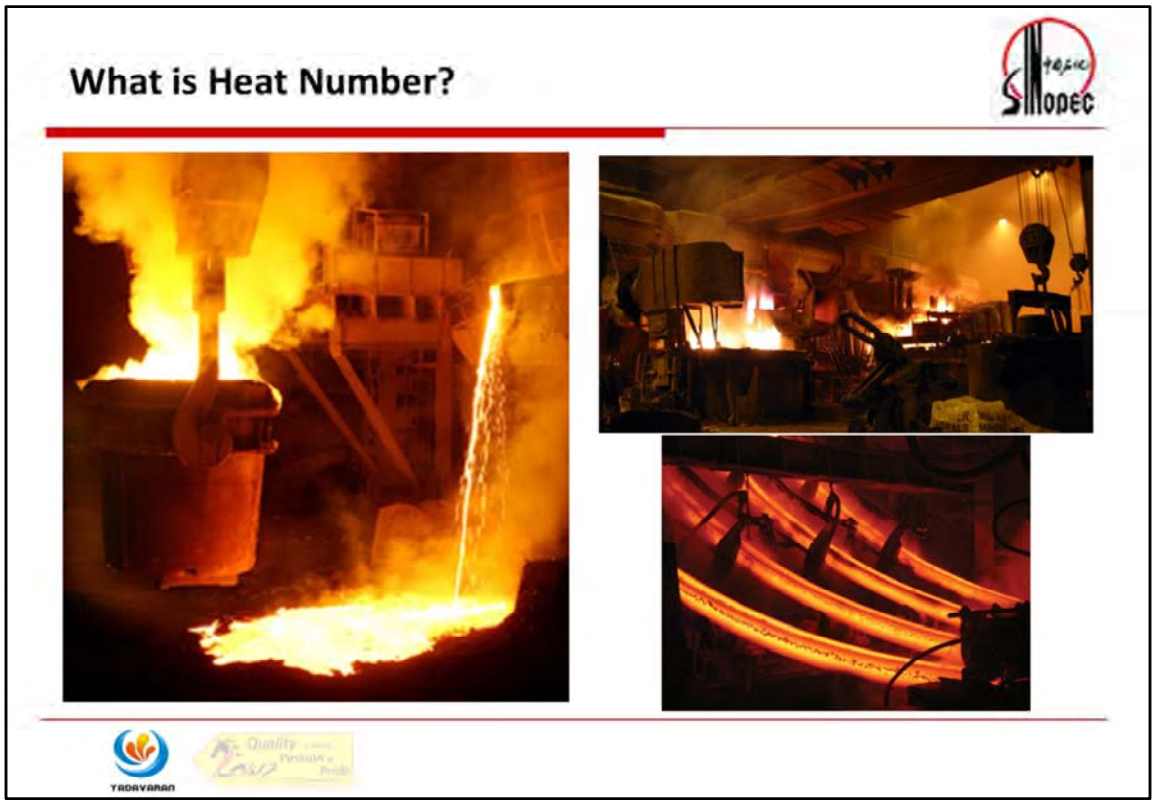
Seal for certification

Note: ISSUED ACCORDING TO EN10204/3.1, NO WELDING REPAIR

SO.
Page: 10-14

Remark:dest1.=destination;tem.=temperature;Manu.=Manufacture;G=Good;Hydro=Hydraulic

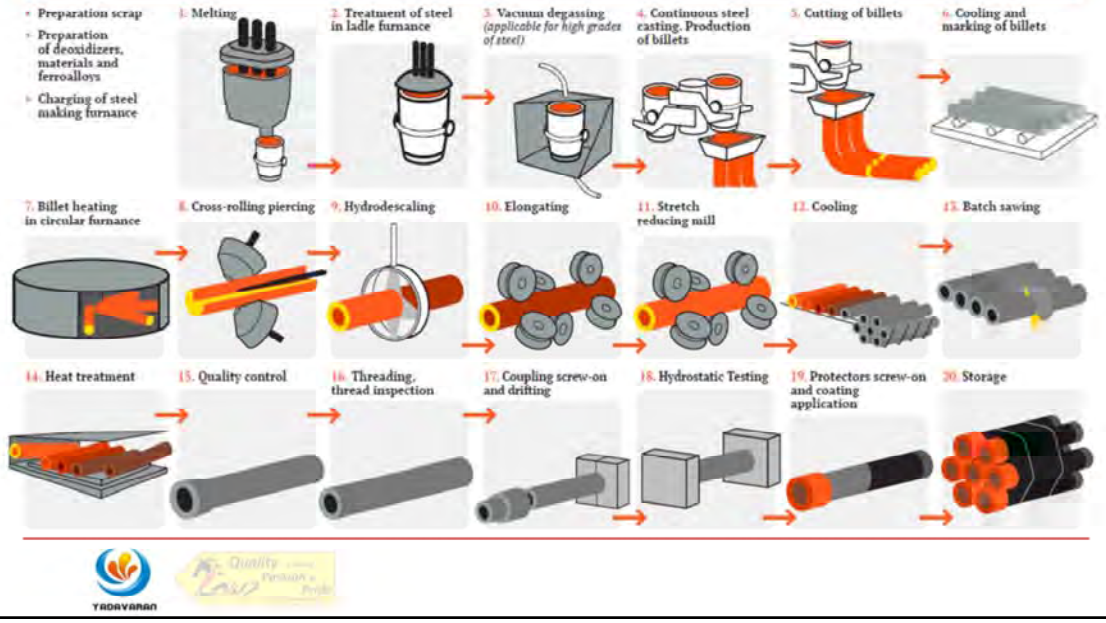
YADAVARAD

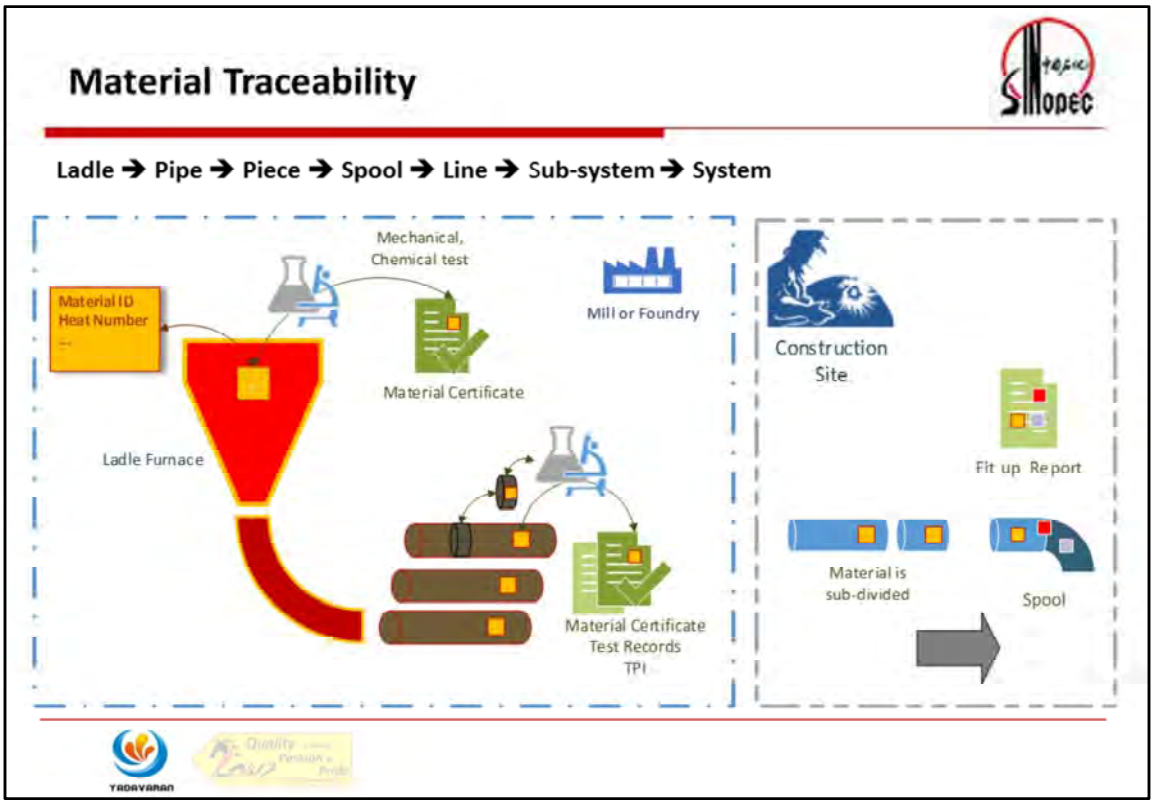


What is Heat
Furnace ladle

Pipe Production Steps

PRODUCTION OF SEAMLESS PIPE (MAIN TECHNOLOGICAL STEPS)





Material Traceability and documents

Traceability is defined as 'the ability to trace the history, application or location of that which is under consideration'.

During incoming material inspection, the inspector shall check and verify that the related inspection documents is related to the inspected items, by tracing the Heat, Batch, Serial Numbers, etc. written on the inspected item and the related inspection documents.

Alloying Elements and Their Effects

Iron	Fe	
Carbon	C	For strength
Manganese	Mn	For toughness
Silicon	Si	< 0.3% deoxidiser
Aluminium	Al	Grain refiner, <0.008% deoxidiser + toughness
Chromium	Cr	Corrosion resistance
Molybdenum	Mo	1% is for creep resistance
Vanadium	V	Strength
Nickel	Ni	Low temperature applications
Copper	Cu	Used for weathering steels
Sulphur	S	Residual element
Phosphorous	P	Residual element
Titanium	Ti	Grain refiner, micro alloying element, Strength &Toughness
Nb	Niobium	Grain refiner, micro alloying element, Strength &Toughness

Thank you