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KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	MATERIAL AND EQUIPMENT STANDARD FOR PIGS (PROJECT STANDARDS AND SPECIFICATIONS)	

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SCOPE

This Project Standards and Specification covers minimum requirement(s) for purchasing various types of non-intelligent pigs generally used in Iranian Oil and Gas Industries.

The pig(s) offered shall be in compliance with the requirement(s) of this Project Standards and Specification. If requirement(s) of this Standard differs from or is in conflict with purchasing document / vendor's offer, the Vendor shall clearly indicate points of conflict and request the Purchaser for Clarification and comments.

The Purchaser comments shall be fully considered and incorporated in the final specification. In case no comment(s) is given by the Purchaser, the following will take precedence in the order of priority as indicated hereunder:

- Purchase order
- Data sheets and drawings
- This Standard specification

The size and temperature/pressure rating of the pig shall fall within the range of the manufacturer's actual experience, only equipment which has proven its-reliability in service is acceptable. Manufacturer shall prepare a list showing the same type and size of pig previously manufactured and operated under similar condition of pigging.

REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

1. ASTM (American Society for Testing and Materials)
 - A 193 "Alloy Steel and Stainless Steel Bolting Materials for High-Temperature Services"
 - A 194 "Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service"
 - A 216 "Carbon-Steel Castings Suitable for Fusion Welding for High-Temperature Service"

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- A 217 "Martensitic Stainless Steel and Alloy Steel Castings Pressure Containing Parts Suitable for High-Temperature Service"
- A 307 "Carbon Steel Externally Threaded Standard Fasteners"
- A 351 "Austenitic Steel Castings for High-Temperature Service"
- A 488 "Steel Casting Welding Qualification of Procedure and Welder"
- A 488 M "Steel Casting Welding Qualification of Procedure and Welder (Metric)"
- 2. SIS (Standardiserings-Kommissionen I Sverige)
 - SIS-05-5900 "Swedish Standards Institution Practice, Surface Preparation Standard for Painting Steel Surface"
- 3. BSI (British Standards Institution)
 - BS 1133 "Packaging Code"
- 4. NACE (National Association Of Corrosion Engineers)
 - NACE RP 0175 - 84 "Sulfide Stress Cracking Resistant Metallic Materials for Oil Field Equipment"

DEFINITIONS AND TERMINOLOGY

Manufacturer - The party that manufactures or produces a pig or its Components covered by this Standard.

Purchaser - The party or parties entering into a contract or agreement to purchase a pig in accordance with the provision of this Standard.

GENERAL

1. Each pig shall withstand the temperature limits as, specified in the data sheet.
2. The manufacturer should state in his proposal, the maximum continuous safe running for the pig.
3. Pigs shall be able to travel the sharp bends stated in data sheet with sufficient sealing activity.
4. The pig shall be so designed that specified line pressure keeps the pig centered and sealed in the pipeline.
5. Different parts of metallic pig body (if applicable) shall be full welded.

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6. Material

- a. Bodies shall normally be of carbon steel.
- b. Unless otherwise specified, brushes should be made of high carbon tempered steel, stainless steel or plastic as applicable.
- c. Unless otherwise specified, gaging plate, in gaging pigs, should be brass, bronze or aluminum alloy.
- d. The following table should be followed for material selection of non-metallic cup.

Cup material	Temperature limit (°C)	Fluid
Cast polyurethane	- 18 to 60	Natural gas, refined hydrocarbon and water
Neoprene	- 29 to 138	General chemical and hydrocarbons
Nitrile (e.g. Hycar)	- 7 to 138	Aromatics: crude and fuel oils

Note:

If the proposed material differs from the above table, the Vendor shall clearly state the points of conflicts, the reason for selection of the material and his experience in using the alternate cup material in actual services.

PURCHASER'S ACCESS TO MANUFACTURING PLANT(S)

The Purchaser or his nominee(s) shall have free access to the manufacturing plant engaged in fabrication of the pigs to carry out the necessary inspection at any stage of the fabrication and witness the tests. The Vendor shall place at disposal of the Purchaser or his nominee(s), free of charge, such instrument(s) and tool(s) as required at the inspection point to enable the Engineer or his nominee(s) to carry out inspection in this respect; such inspections in no way relieve the manufacturer of his responsibilities under the term of this Standard specification and/or other applicable documents.

TESTING

All pigs shall be tested in accordance with manufacturer's standard.

INSPECTION

Manufacturer shall be prepared for inspection of the pig by the Purchaser.

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FINISHING, PAINTING AND/OR COATING

1. All pigs shall be thoroughly cleaned and suitably preserved on completion of manufacturing.
2. All machined or threaded surfaces shall be protected from corrosion with a rust-preventive material which shall not become fluid and run-off at a temperature less than 80°C. The shipment and storage time shall be assumed to be 18 months.
3. Unless otherwise specified in purchase documents, non-ferrous parts, stainless steel and non-metallic portion of the pig shall not be painted.

IDENTIFICATION

1. Manufacturer's Marking

Each pig shall be marked in accordance with manufacturer standard.

2. Contract Tagging

- a. Each metallic pig shall be fitted with a rust-resistant metal tag securely attached to it with sufficient twist of stainless steel wire.
- b. Tags shall not be attached through bolt holes of pig flanges.
- c. Non-metallic pigs should be marked with an identification number and tag shall be stamped on the appropriate storage box with same identification number.
- d. The minimum dimension for tags and wires are as follows:
 - Size of tag Round 40 mm (1½ inches)
 - Rectangular 12 x 70 mm (½ x 2¾ inches)
 - Thickness of tag 16 B & S Gage (1.3 mm) minimum
 - Lettering height 6 mm (¼ inches) minimum
 - Wire diameter 16 B & S Gage (1.3 mm) minimum

Note:

B & S gage is the abbreviation of Brown and sharp gage stating the thickness of wire and sheet metal.

PACKING

Pig packing shall meet the requirements of standard BS 1133.

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HANDLING AND SHIPPING

Packing shall be such that, during handling, shipping (including overland transportation) and storage pig(s) and accessories do not suffer any damage.

REJECT CAUSES

The pig may be rejected if measurement, inspection and/or testing reveals discrepancies between quoted figures in purchase-documents and those obtained actually.

DOCUMENTATION AND LANGUAGE

All documents furnished by manufacturer shall be in English.

APPROPRIATE PIGS SPECIFICATION(S)

1. Flexible Bodied, Non-Metallic, One Piece Construction

They shall be adequately flexible, having conical cup with efficient sealing action as the pressure differential across the pig increases.

2. Mechanical Pigs-Articulated Bodied (Multi-Use Pigs)

- a. They shall have the swabbing, cleaning and liquid batching operating capability all together or in consequent by using of different accessories as and when requested in the Purchase documents.
- b. Pig body shall be suitable for installation of electronic pig signaler.
- c. Cup flange shall have suitable bolt circle diameter with adequate number of bolts to provide the better sealing and flexibility for the cup.
- d. Each pig shall have by pass ports based on the following table, unless otherwise specified.
- e. Urethane cups should be fluid pressure expandable for wear compensation.
- f. Wear compensating brushes are preferred. However, the type of brushes will be specified in purchase document.
- g. Scraper blades should be placed on the pig body about 30° to the direction of travel.