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NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL ENGINEERING
& CONSTRUCTION COMPANY

NIOEC SP

NIOEC SPECIFICATION
FOR

PIPELINE STRAINERS AND FILTERS

FIRST EDITION

MARCH , 2008

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IN THE NAME OF GOD**FOREWORD**

By their very nature, technical Specifications are continuously subject to modifications and revisions. To strengthen their merit and usefulness, continuous improvements, addendum, deletion of disparate information and consequently provision of updated revisions are to be made in order to ascertain that such Specifications meet the current requirements, inclusive of Iranian Petroleum Standards (IPS) and the recognized and acceptable national and international Standards, as well as the optimal codes and practices based on the accumulated in-house know-how and plant knowledge and experiences.

However, in reality, due to several reasons, not to mention the complexity of the matter, the ultimate goal of continuous direct embedment of the required changes on the relevant Specifications may be far reaching. Therefore, in the interim periods between the officially issued revisions, the required changes will appear in other documents related to the engineering and design work of the ongoing projects.

In response to the initiative of the Design and Engineering Directorate, and considering that the task of the execution of several important and mega projects for the realization of the new oil refineries, pipelines and oil terminals as well as improvements of the existing facilities, has been assigned to NIOEC, it was decided to update the NIOEC Specifications and to issue new official revisions.

The Design and Engineering Directorate was itself entrusted to carry out this important task, and as such by forming several special technical committees, working in close co-operation and cohesion and sharing their expertise and knowledge, the updated and revised NIOEC Specifications were successfully prepared and complied.

These Specifications are intended to be used for Oil Refineries, Distribution Depots, Oil Terminals, Pipelines and Pump Stations within NIOEC's projects, and have been proven to be of high value for such purposes. It must however be appreciated that these Specifications represent the minimum requirements and should in no way be interpreted as a restriction on the use of better procedures, engineering and design practices or materials.

We encourage and highly appreciate the users and other clear sighted and experts to send their comments on the Specifications to the Design and Engineering Director of NIOEC for evaluation and approval.

REVISION INDEX

REV. PAGE	1	2	3	4	5	REV. PAGE	1	2	3	4	5	REV. PAGE	1	2	3	4	5	REV. PAGE	1	2	3	4	5
1						26						51						76					
2		X				27						52						77					
3	X	X				28						53						78					
4		X				29						54						79					
5	X	X				30						55						80					
6		X				31						56						81					
7		X				32						57						82					
8		X				33						58						83					
9						34						59						84					
10						35						60						85					
11						36						61						86					
12						37						62						87					
13						38						63						88					
14						39						64						89					
15						40						65						90					
16						41						66						91					
17						42						67						92					
18						43						68						93					
19						44						69						94					
20						45						70						95					
21						46						71						96					
22						47						72						97					
23						48						73						98					
24						49						74						99					
25						50						75						100					

NOTES:

- 1) THIS SHEET IS A RECORD OF ALL REVISIONS TO THIS SPECIFICATION.
- 2) WHEN APPROVED EACH REVISION SHALL BE CONSIDERED AS A PART OF THE ORIGINAL DOCUMENT.
- 3) NUMBER OF PAGES EXCLUDES THIS SHEET AND THE COVER SHEET.

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CONTENTS:	PAGE NO.
INTRODUCTION	2
1. SCOPE.....	2
2. REFERENCES	2
3. UNITS.....	4
4. MODIFICATION TO IPS-G-PI-230(2).....	4
6. STRAINER AND FILTER DESIGN, FABRICATION AND ASSEMBLY	4
7. MATERIAL AND DIMENSION.....	5
10. TESTS	5

INTRODUCTION

To satisfy the requirements of this NIOEC Specification, Iranian Petroleum Standard [IPS-G-PI-230](#) (2) (April 2015) with the modifications as specified hereinafter shall be strictly followed.

Articles 1, 2 & 4 of this document replace entirely the related articles in the referenced IPS Standard.

1. SCOPE

This NIOEC Specification covers general requirements for design material, fabrication, inspection and test of different types of strainers and filters mainly used in suction lines of pumps, compressors and turbines in pipeline installation intended for crude oil and petroleum products services.

Deviation from this specification will only be permitted on obtaining written approval from NIOEC.

Resolution on cases not explicitly stipulated in this Specification, or on cases where conflicts may arise among the requirements of the referenced IPS and the international standards, shall be made through written consent and approval of NIOEC.

2. REFERENCES

The following standards, codes, and specifications, to the extent specified hereinafter, shall constitute a part of this NIOEC Specification. Latest edition of the undated referenced documents and the cited edition of the dated references shall apply. The applicability of changes made to the dated references ,after the cited date shall be mutually agreed upon between NIOEC and the vendor/contractor.

API (AMERICAN PETROLEUM INSTITUTE)

API 5L "Specification for Line Pipe"

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERING)

ASME B16.34 "Valves-Flanged, Threaded, and Welding Ends"

ASME B16.5 "Pipe Flanges and Flanged Fittings"

ASME B1.20.1 "Pipe Threads, General Purpose"

ASME B31.3 "Chemical Plant and Petroleum Refinery Piping"

ASME Section VIII Div I "Rules for construction of pressure vessels"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

ASTM A370 "Test Method and Definitions for Mechanical Testing of Steel Products"

ASTM A435 "Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates"

ASTM E125 "Reference Photographs for Magnetic Particle Indication on Ferrous Casting"

ASTM E142 "Method for Controlling Quality of Radiographic Testing"

ASTM E165	"Practice for Liquid Penetrant Inspection Method"
ASTM E186	"Reference Radiographs for Heavy Walled Steel Casting"
ASTM E446	"Referenced Radiographs for Steel Casting up to 51 mm (2") in Thickness"
ASTM A216/A216M	"Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service1"
ASTM A105/A105M	"Standard Specification for Carbon Steel Forgings for Piping Applications"
ASTM A240/A240M	"Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications"

IPS (IRANIAN PETROLUM STANDARD)

IPS-G-PI-230	"General Standard for Strainers and Filters"
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ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

ISO 148	"Charpy Impact Test (V Notch)"
ISO 8501-1	"Preparation of Steel Structures before Application of Paints and Related Products-Visual Assessment of Surface Cleanliness"

NIOEC-SP (NIOEC SPECIFICATIONS)

NIOEC-SP-00-10	"NIOEC Specification for Units"
NIOEC-SP-80-02	"NIOEC Specification for Paints"
NIOEC-SP-50-10	"NIOEC Specification for Piping Material Purchasing-Flange"
NIOEC-SP-50-11	"NIOEC Specification for Piping Material Purchasing-Fitting"
NIOEC-SP-50-64	"NIOEC Specification for Pipeline & Piping Material"

NIOEC-SD (NIOEC STANDARD DRAWING)

NIOEC-SD-5013-1/1	"Underground & Misc. Piping Details"
NIOEC-SD-5048-1/1	"Suction Strainers for Pumps "Y" Type"
NIOEC-SD-5049-1/1	"Suction Strainers for Pumps "T" Type"
NIOEC-SD-5050-1/1	"Flat Type Suction Strainers"
NIOEC-SD-5047-1/1	"Conical Type Suction Strainers"

NIOEC-SIP (SHOP INSPECTION PROCEDURES)

NIOEC-SIP-41-03	"Shop Inspection Procedure for pressure vessel"
NIOEC-SIP-50-26	"Shop Inspection Procedure for Strainers"
NIOEC-SIP-47-16	"Shop Inspection Procedure for Filters"

UL (UNDERWRITERS LABORATORIES)

- UL 331 "Strainers for Flammable Fluids and Anhydrous Ammonia"
- UL 1105 "Marine Use Filters, Strainers and Separators"
- UL 1193 "Marine Filters and Strainers for Non-Flammable Liquids"

3. UNITS

International system of units (SI) shall be used in accordance with NIOEC-SP-00-10, unless otherwise specified.

4. MODIFICATION TO IPS-G-PI-230(2)

This addendum revises the below listed articles of the referenced standard as follows:

6. STRAINER AND FILTER DESIGN, FABRICATION AND ASSEMBLY**ARTICLE 6.25 – (MODIFICATION)**

The following paragraph shall be added to the IPS-G-PI-230, article 6.25:

The strainer housing shall be equipped with two drain connection, branched from one outlet and also the strainer housing or upstream of strainer shall be equipped with one pressure safety valve connection. Nozzles with size 2" and larger shall be flanged in according to ASME B 16.5.

ARTICLE 6.27 – (ADDITION)

Shell body shall be rigid and supplied with appropriate support for mounting on a suitable base. An arrow which is indicated the direction of flow shall be embossed on body of strainer.

ARTICLE 6.28 – (ADDITION)

The strainer design shall be such that the pressure drop across the strainer at maximum flow rate shall not exceed 13.8 kpa when the strainer is clean.

ARTICLE 6.29 – (ADDITION)

The strainer shall be the basket "T" type (see NIOEC-SD-5049-1/1) and easy removable from top-side without draining the strainer chamber.

ARTICLE 6.30 – (ADDITION)

Door Switch: the strainer door shall be equipped with two SPDT micro-switches, EXD and W/P suitable for operating on 24 volt DC at two Ampere ratings.

ARTICLE 6.31 – (ADDITION)

Two lifting lugs and adequate support shall be provided for each strainer.

ARTICLE 6.32 – (ADDITION)

All welded nozzles and support legs shall have adequate reinforcement to withstand haulage, operating and maintenance static and fatigue loads.

7. MATERIAL AND DIMENSION**ARTICLE 7.11 – (ADDITION)**

Substitution of material may be made only upon approval of NIOEC.

ARTICLE 7.12 – (ADDITION)

Strainer materials shall be of the highest quality and type suitable for the specified service. Materials which are used for the main parts of the strainers shall not be inferior to the following:

Body and covers: Cast Steel ASTM A216WCB, alternatively fabricated Steel API 5L GR B, ASTM A105.

Filter baskets and mesh inserts: stainless steel A240/A240M GR.316

Fittings: ASTM A105

ARTICLE 7.13 – (ADDITION)

Corrosion allowance shall be specified with a minimum value of 1.6 CA.

10. TESTS**ARTICLE 10.11 – (ADDITION)**

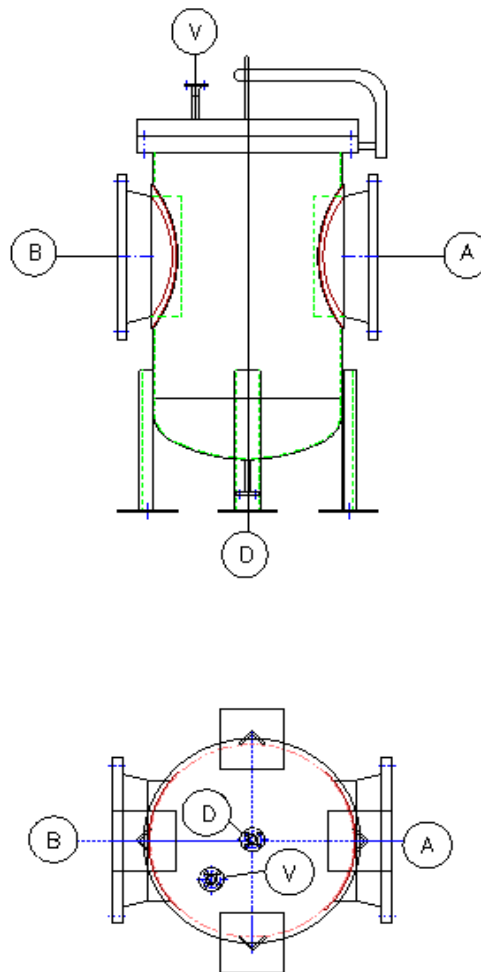
Each plate of the body shall be ultrasonically tested. Method of testing and acceptance criteria shall be in accordance with ASTM A435.

ARTICLE 12.1 – (MODIFICATION)

The NIOEC specification NIOEC-SP-80-02 is replaced with IPS-E-TP-100 at the end of paragraph.

TYPICAL DATA SHEET FOR STRAINER		
GENERAL INFORMATION		
STRAINER TYPE:		
TAG No.		
QUANTITY REQUIRED: (OPERATING -- , SPARE --)		
Size (in)		
Line Number ON P&ID		
End Connection		
Rating		
Corrosion Allowance		
OPERATING CONDITIONS		
FLUID		
NORMAL FLOW RATE	(BBL/Day)	
DENSITY	(kg/m ³)	
VISCOSITY (AT NOR T.)	Cp	
OPERATING PRESSURE	(barg)	
OPERATING TEMP. Min/Nor/Max	(°C)	
MAX. ALLOWABLE PRESSURE DROP	(Psi)	
FILTRATION DEGREE	-	
FILTER EFFICIENCY	-	
DIFFERENTIAL PRESSURE (CLEAN)(	BAR	
DIFFERENTIAL PRESSURE (CONTAMINATED	BAR	
CONTAMINANT	(PM/Wt)	
CORROSIVE CONTAMINANT		
SOLID TO BE FILTERED		
. Solid Type(Coke/ Cristal/ Granul/ Other)		
. Solid Quantity	ppm	
. Filtration Degree	mm	
. Solid Size (From / To)	mm	
DESIGN DATA		
DESIGN FLOW RATE	(BBL/Day)	
DESIGN PRESSURE	(barg)	
DESIGN TEMP Min./Max	(° C)	
CORROSION ALLOWANCE	(mm)	
HYDROSTATIC TEST PRESSURE	(barg)	
WIND SPEED	(Km/hr)	
EARTHQUAKE ZONE / SOIL TYPE		
JOINT EFFICIENCY (HEAD /SHELL)		
PAINTING		
DESIGN CODE		
MATERIALS		
BODY & COVER		
INNER & SCREEN		

FLANGES		
PIPES		
PLUG		
BOLTS/ NUTS		
GASKETS		
FITTING		
STRUCTURAL (LIFTING LUG, SUPPORT,...)		
DIMENSIONS & WEIGHTS		
DIAMETER/ HEIGHT (TL/TL)	mm	
SHELL / HEAD A.F. THICKNESS	mm	
WEIGHT (EMPTY/OPERATING)	Kg	
ACCESSORIES		
DIFFERENTIAL PRESSURE GAUGE ☐		PRESSURE GAUGE ☐
PRESSURE SWITCH ☐		SAFETY VALVE ☐
DRAIN VALVE ☐		VENT VALVE ☐
FOUNDATION BOLTS ☐		METAL PARTICLE COLLECTING MAGNET
○ LADDER & PLATFORM ☐		● LIFTING LUG ☐
○ INLET BOX ☐		● EARTHING BOSS ☐
○ VORTEX BREAKER ☐		○ INSULATION SUPPORT ☐
○ BOOT ☐		● NAME PLATE ☐
● SUPPORT (LEG) ☐		○ PWHT ☐
○ COILING ☐		● DAVIT ☐
INSULATION ☐		Tracing ☐
HEATING JACKET/COIL ☐		COOLING JACKET/COIL ☐
CLEANABILITY REQUIREMENTS		
ON LINE BACKWASH ☐		OFF LINE CLEANING ☐
REQUIREMENTS FOR PACKAGED UNITS		
<u>FILTERS PER UNIT ACCESSORIES:</u> SKID ☐ INTERCONNECTING PIPING ☐ REMOTE CONTROL PANEL REMOTE.. ☐ CONTROL PANEL ☐ LOCAL CONTROL PANEL ☐ FLOW LINE ANNOUNCIATOR ☐		<u>CONTROL SYSTEM :</u> DIFFERENTIAL PRESSURE DEPENDENT ☐ <u>BACKWASHING</u> BACKWASHING AUTO ☐ MANUAL ☐ NONE ☐ ISOLATION AUTO ☐ MANUAL ☐ <u>ALARMS & SHUTDOWNS</u> MAX. PRESSURE A ☐ SD ☐ MAX. TEMPERATURE A ☐ SD ☐ MAX. PRESSURE DROP A ☐ SD ☐
CONNECTONS		
ITEM	SERVICE	SIZE
A	INLET	
B	OUTLET	
D	DRAIN	
V	VENT	
	MANHOLE	
TEST & INSPECTION		
RADIOGRAPHY		YES
HYDROSTATIC TEST		YES
VISUAL TEST		YES
OTHER		AS PER CODE

General Notes:

**GENERAL STANDARD
FOR
STRAINERS AND FILTERS**

**SECOND REVISION
APRIL 2015**

استاندارد عمومی

برای

صافی‌ها و فیلترها

ویرایش دوم

اردیبهشت ۱۳۹۴

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این استاندارد متعلق به وزارت نفت ایران است. تمام حقوق متعلق به مالک است. تمام و یا بخشی از این استاندارد نباید بدون رضایت کتبی وزارت نفت ایران، به هر شکل یا به هر وسیله (تکثیر، ذخیره سازی، انتقال یا روشهای دیگر) در اختیار اشخاص ثالث قرار گیرد.

FOREWORD

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS are based on internationally acceptable standards and include selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein.

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

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پیش گفتار

استانداردهای نفت ایران (IPS) منعکس کننده دیدگاههای وزارت نفت ایران است و برای استفاده در تأسیسات تولید نفت و گاز ، پالایشگاههای نفت ، واحدهای شیمیائی و پتروشیمی ، تأسیسات انتقال و فراورش گاز و سایر تأسیسات مشابه تهیه شده است .

استانداردهای نفت، براساس استانداردهای قابل قبول بین المللی تهیه شده و شامل گزیده هائی از استانداردهای مرجع در هر مورد می باشد . همچنین سایر الزامات و / یا اصلاحات مورد نیاز براساس تجربیات صنعت نفت کشور و امکانات تأمین داخل در استانداردها گنجانده شده است ، مواردی از گزینه های فنی که در متن استانداردها آورده نشده است در برگ داده ها بصورت شماره گذاری شده برای استفاده مناسب کاربران آورده شده است .

استانداردهای نفت، بشکلی کاملاً انعطاف پذیر تدوین شده است تا کاربران بتوانند نیازهای خود را با آنها منطبق نمایند . با این حال ممکن است در مواردی همه نیازهای پروژه ها را پوشش ندهند . در این گونه موارد باید الحاقیه ای که نیازهای خاص آنها را تامین مینماید تهیه و پیوست نمایند . این الحاقیه همراه با استاندارد مربوطه ، مشخصات فنی آن پروژه و یا کار خاص را تشکیل خواهند داد .

استانداردهای نفت تقریباً هر پنج سال یکبار مورد بررسی قرار گرفته و روز آمد میگردند . در این بررسی ها ممکن است استاندارد حذف و یا الحاقیه ای بآن اضافه شود و بنابر این همواره آخرین ویرایش آنها ملاک عمل میباشد .

از کاربران استاندارد، درخواست میشود نقطه نظرها و پیشنهادات اصلاحی و یا هرگونه الحاقیه ای که برای موارد خاص تهیه نموده اند، به نشانی زیر ارسال نمایند . نظرات و پیشنهادات دریافتی در کمیته های فنی مربوطه بررسی و در صورت تصویب در تجدید نظرهای بعدی استاندارد منعکس خواهد شد .

ایران ، تهران ، خیابان کریمخان زند ، خردمند شمالی کوچه

چهاردهم ، شماره ۱۷

اداره تحقیقات و استانداردها

کدپستی : ۱۵۸۵۸۸۶۸۵۱

تلفن : ۶۰ - ۸۸۸۱۰۴۵۹ و ۶۶۱۵۳۰۵۵

دور نگار : ۸۸۸۱۰۴۶۲

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پست الکترونیک: