



شرکت پالایش نفت امام خمینی (ره) شازند «سهامی عام»

شماره مجوز: .....

نوبت .....

### «تجدید آگهی ارزیابی کیفی تولید کنندگان و تامین کنندگان»

شرکت پالایش نفت امام خمینی (ره) شازند در نظر دارد کالاهای موضوع بند «یک» آگهی حاضر را از طریق برگزاری مناقصه عمومی دو مرحله‌ای از تولید کننده / تامین کننده واجد شرایط خریداری و تامین نماید.

الف) موضوع مناقصه

الف) شرح مختصر کالا

ردیف	شماره مناقصه	شرح مختصر کالا	مقدار/تعداد	برآورد هزینه انجام موضوع مناقصه (ریال)	مبلغ تضمین شرکت در فرآیند ارجاع کار (ریال)
۱	RND-9818235-MY (تجدید آگهی)	کاتالیست R.F.C.C	۵۰۰۰ تن	۱,۵۰۰,۰۰۰,۰۰۰,۰۰۰	۲۶,۷۰۰,۰۰۰,۰۰۰

#### ب) شرایط اولیه متقاضی

- داشتن شخصیت حقوقی، شماره اقتصادی، توانایی مالی، سابقه کار مفید و مرتبط با موضوع مناقصه.
- داشتن کد ملی/شناسه ملی جهت شرکت در مناقصه الزامی است.
- داشتن حسن سابقه و ارائه گواهینامه‌های مورد نظر از خریداران قبلی و اعلام اسامی خریداران قبلی در صورت لزوم.
- توانایی ارائه تضمین شرکت در فرآیند ارجاع کار (در صورت تأیید در ارزیابی کیفی مناقصه‌گران) و همچنین تضمین انجام تعهدات (در صورت برنده شدن در مناقصه) مطابق آیین‌نامه تضمین برای معاملات دولتی موضوع تصویب‌نامه هیأت وزیران به شماره ۱۲۳۴۰۲/ت مورخ ۱۳۹۴/۰۹/۲۲.
- داشتن صورتهای مالی حسابرسی شده توسط سازمان حسابرسی یا اعضاء جامعه حسابداران رسمی، مطابق با ماده ۲ این‌نامه راهکارهای افزایش ضمانت اجرائی و تقویت حسابرسی، جهت مناقصه ردیف «۱» الزامی می‌باشد.

#### ۲) نام و نشانی دستگاه مناقصه‌گزار

شرکت پالایش نفت امام خمینی (ره) شازند واقع در استان مرکزی، اراک- کیلومتر ۲۰ جاده بروجرد.

#### ۳) مهلت و محل دریافت فرمهای استعلام ارزیابی کیفی

متقاضیانی که دارای شرایط اولیه (بند ب) بوده و آمادگی لازم جهت انجام مناقصه مذکور را دارند، می‌توانند پس از انتشار آگهی نوبت دوم (۳ روز پس از انتشار آگهی نوبت اول) به مدت ۵ روزگاری ضمن ارسال تقاضای شرکت در مناقصه مورد نظر از طریق نمابر ۰۲۱-۶۱۶۲۳۶۶۰ و ۰۲۱-۳۳۶۷۲۰۱۳-۰۸۶، فرمهای استعلام ارزیابی کیفی را از پایگاه اینترنتی این شرکت به آدرس WWW.IKORC.IR دریافت و بر اساس آن مدارک لازم را تکمیل و صرفاً بر روی لوح فشرده (CD) به این شرکت تحویل یا ارسال نمایند.

#### ۴) زمان و محل تحویل اسناد ارزیابی کیفی (تکمیل شده توسط متقاضیان)

زمان تحویل اسناد ارزیابی کیفی توسط مناقصه‌گران، ۲ هفته پس از آخرین مهلت ارسال تقاضای شرکت در مناقصه می‌باشد. ضمناً محل تحویل یا ارسال لوح فشرده (CD) حاوی فرمها و مدارک تکمیل شده، به نشانی اراک- کیلومتر ۲۰ جاده بروجرد- سه راهی شازند- شرکت پالایش نفت امام خمینی (ره) شازند- اداره تدارکات و امور کالا- ساختمان ب- طبقه همکف اتاق ۱۲۱- کدپستی ۴۱۱۱۱-۳۸۶۷۱-۳۳۴۹۲۸۴۰ و ۳۳۴۹۲۹۱۶-۳۳۴۹۲۸۴۰ می‌باشد. بدیهی است به مدارک ارسالی بعد از مهلت مقرر ترتیب اثر داده نخواهد شد ضمناً دادن پیشنهاد و ارائه اسناد و مدارک هیچگونه حقی برای متقاضی ایجاد نمی‌کند. لازم بذکر است دستگاه مناقصه‌گزار پس از وصول لوح فشرده حاوی اسناد ارزیابی کیفی ظرف مدت ۱ ماه نسبت به اعلام اسامی واجدین شرایط اقدام خواهد نمود.

**توجه:** مناقصه‌گران نخست با مراجعه به سایت این شرکت (همزمان با انتشار آگهی نوبت دوم) می‌بایست ۲ برگ فرم ارزیابی کیفی را اخذ و پس از تکمیل به همراه مدارک مربوطه، صرفاً بر روی لوح فشرده (CD) درج و در موعد مقرر به آدرس این شرکت ارسال یا تحویل نمایند، این شرکت نیز پس از ارزیابی کیفی متقاضیان، از شرکت‌هایی که حداقل امتیاز قابل قبول را کسب نموده باشند، جهت دریافت اسناد مناقصه دعوت بعمل خواهد آورد.

روابط عمومی شرکت پالایش نفت امام خمینی (ره) شازند

آدرس اینترنتی: WWW.IKORC.IR

چاپ اول : تاریخ ۹۹/۰۴/۲۰ روزنامه گسترش صمت

چاپ دوم: تاریخ ۹۹/۰۴/۲۴ روزنامه گسترش صمت

• آخرین مهلت اعلام آمادگی توسط فاکس تا تاریخ ۹۹/۰۴/۲۱ میباشد و متعاقباً شرکتهایی

که اعلام آمادگی نمودند تا پایان وقت اداری روز دوشنبه مورخ ۹۹/۰۴/۱۶ مهلت دارند CD

ارزیابی کیفی را بر اساس مدارک پیوست تحویل نمایند.



شرکت پالایش نفت امام خمینی (ره) سازند (سهامی عام)

شرکت / فروشگاه محترم ..... مناقصه عمومی دو مرحله‌ای شماره: RND-9818235-MY

لطفاً به منظور انجام ارزیابی کیفی آن شرکت / فروشگاه، طبق جداول و محاسبات پیوست مدارک و مستندات ذیل را ارائه فرمایید:

### ۱- جهت ارزیابی توان مالی

الف: مدارک مورد نیاز جهت ارزیابی حداقل یکی از موارد ذیل:

۱-الف: مالیات متوسط سالانه پرداخت شده (برگ تشخیص / قطعی مالیات عملکرد پنج ساله اخیر)

۲-الف: فروش یکسال گذشته (لیست خریداران شامل نام خریدار، شرح کالا، مبلغ کالا)

۳-الف: اظهار نامه مالیاتی

۴-الف: حداکثر تأییدیه کتبی اعتبار از طرف بانکها

۵-الف: دارائیهایی ثابت

۶-الف: متوسط بیمه سالانه

۷-الف: صورتهای مالی حسابرسی شده توسط سازمان حسابرسی یا موسسات حسابرسی مورد تأیید

تبصره: ارائه صورتهای مالی حسابرسی شده (بند ۷-الف) در خصوص معاملاتی که مبلغ آن بیش از ۱۰ برابر نصاب معاملات متوسط باشد الزامیست.

ب: نحوه ارزیابی و امتیاز دهی توان مالی:

(مالیات متوسط سالانه  $\times 100$  / فروش یک سال گذشته / تأییدیه کتبی اعتبار بانکی) = RI برآورد = ES

امتیاز	فرمول
۱۰۰	$1/2 \times ES \leq RI$
۹۰	$ES \leq RI < 1/2 \times ES$
۸۰	$.8 \times ES \leq RI < ES$
۷۰	$.6 \times ES \leq RI < .8 \times ES$
۶۰	$RI < .6 \times ES$

### ۲- جهت ارزیابی حسن سابقه / مشتریان قبلی / تضمین کیفیت و تضمین خدمات محصولات مدارک ذیل مورد نیاز است:

الف: کیفیت کالای مورد نظر (ارائه مدارکی مبنی بر فروش کالای مورد نظر به خریداران / ارائه مدارکی مبنی بر تطابق مشخصات فنی ارائه شده از سوی فروشنده با کالای مورد نظر)

ب: ارائه استانداردها و گواهی تضمین کیفیت ساخت کالای مورد نظر فروخته شده (در صورت موجود بودن)

ج: ارائه مدارک مربوطه در خصوص دارا بودن نمایندگی

د: ارائه تأییدیه کالای فروخته شده

### ۳- جهت ارزیابی تجربی مدارک ذیل مورد نیاز است:

الف: ارائه اساسنامه شرکت یا پروانه کسب

ب: ارائه شماره اقتصادی / کد ملی



تاریخ:

شرکت پالایش نفت امام خمینی (ره) سازند (سهامی عام)  
فرم ارزیابی کیفی تأمین کنندگان / سازندگان / تولید کننده کالا

تجدید مناقصه عمومی دو مرحله‌ای شماره: RND-9818235-MY نام شرکت:

تحت عنوان: خرید ۸۰۰۰ تن کاتالیست R.F.C.C

A: توان مالی

ارزیابی بر اساس یکی از پارامترهای ذیل انجام می شود:

<input type="checkbox"/> در آمد / فروش سالانه	<input type="checkbox"/> اظهار نامه مالیاتی	<input type="checkbox"/> متوسط مالیات سالانه
<input type="checkbox"/> دارائی های ثابت	<input type="checkbox"/> تأیید کتبی اعتبار بانکی	<input type="checkbox"/> متوسط بیمه سالانه
<input type="checkbox"/> صورتهای مالی حسابرسی شده: دارد <input type="checkbox"/> ندارد	میزان توان مالی	میلیارد ریال
امتیاز کسب شده:	۶۰ <input type="checkbox"/>	۷۰ <input checked="" type="checkbox"/>
	۸۰ <input type="checkbox"/>	۹۰ <input type="checkbox"/>
	۱۰۰ <input type="checkbox"/>	

حداقل امتیاز لازم: ۷۰

B: ارزیابی مشتریان قبلی، حسن سابقه و تضمین کیفیت و خدمات محصولات

پارامترهای ارزیابی	عالی امتیاز ۵	بسیار خوب امتیاز ۴	خوب امتیاز ۳	مورد تأیید نیست
کیفیت کالای مورد نظر مندرج در اسناد فنی ارائه شده	<input checked="" type="checkbox"/>			
خدمات و پشتیبانی، داشتن تجربه و دانش مشابه		<input checked="" type="checkbox"/>		
انجام تعهدات (گارانتی)		<input checked="" type="checkbox"/>		
ظرفیت تولید (با ارائه مستندات)		<input checked="" type="checkbox"/>		
توان تجهیزاتی (در خصوص تولید کنندگان قابل ارزیابی می باشد)		<input checked="" type="checkbox"/>		

امتیاز ۸۰

$$(21/25) \times 100 = 84$$

C: ارزیابی تجربی

سال تأسیس:

امتیاز	سابقه	
۱۰۰	با بیش از ۱۰ سال سابقه	تولید کننده / سازنده کالا
۹۰	۵ سال تا ۱۰ سال سابقه	
۸۰	با کمتر از ۵ سال سابقه	
۸۰	با بیش از ۱۰ سال سابقه	تأمین کننده کالا
۷۰	۵ سال تا ۱۰ سال سابقه	
۶۰	با کمتر از ۵ سال سابقه	

امتیاز سازنده کالا: ۸۰

امتیاز تأمین کننده کالا: ۶۰

اولویت معیارها:

۲	A
۱	B
۲	C

امتیاز کل =

فرمول

امتیاز سازنده / تولید کننده کالا :  
امتیاز تأمین کننده کالا :

بر اساس ارزیابی مدارک فوق شرکت مذکور مورد تأیید می باشد

به دلیل عدم ارائه مدارک ذیل، شرکت مذکور مورد تأیید نمی باشد

- ۱- عدم ارائه مدارک مالی
- ۲- عدم ارائه مدارک حسن سابقه و ..
- ۳- عدم ارائه مدارک تجربه و سوابق مربوط

بررسی کننده:

Handwritten signatures and stamps at the bottom of the page.



شرکت نالایش نفت امام خمینی (ره) سازند (سهامی عام)

مناقصه عمومی دو مرحله‌ای شماره: RND-9818235-MY

۴ - قیمت تراز شده به نحوه زیر محاسبه میگردد و تعیین برنده پس از بررسی قیمت تراز شده انجام خواهد شد:

$$L = \frac{100 \times C}{100 - [i \times (100 - t)]}$$

L = قیمت تراز شده

C = قیمت پیشنهادی (درج شده در پاکت قیمت)

i = ضریب تاثیر (بین ۰,۴ تا ۰,۶) ۰,۴

t = امتیاز کل فنی بازرگانی (بین حداقل امتیاز فنی بازرگانی قابل قبول تا صد)

## مشخصات فنی و اطلاعات مربوطه:

مقدار	واحد	شرح کالا	ردیف
5000	MT	CATALYST FOR R.F.C.C UNIT (According to "Technical Specifications for Supply of RFCC Catalyst")	1

## الزامات فروشنده:

۱- معیار وزن هر محموله وزن کاتالیست خشک (Dry Basis) می باشد لذا درصد وزنی مواد فرار (Loss on Ignition @ 800° C , 2hr) در هر محموله ارسالی باید توسط فروشنده اعلام و وزن آن محموله بر مبنای خشک لحاظ گردد لذا وزن واقعی محموله ارسالی (Mr) توسط رابطه زیر محاسبه و ارسال گردد:

$$M_r = M_d / (1 - LOI/100)1$$

Mr =Real Weight of each cargo

M<sub>d</sub>=Dray weight of each cargo

LOI =Loss of ignition (wt%)

\* معیار وزن خالص خریداری شده کاتالیست در رابطه فوق M<sub>d</sub> می باشد.

\* به عنوان مثال  $W_d = W_r \times (1 - LOI\%) = 8988 (1 - 0.11) = 8000 \text{ TONS}$  با توجه به ۱۱٪ میزان LOI اعلامی شرکت REZEL میزان کاتالیست خشک تحویلی باید ۸۹۸۸ تن باشد. گرچه میزان LOI بازرسی شخص ثالث مبنای محاسبه وزن در هر محموله ۲۰۰۰ تنی خواهد بود.

۲- به منظور بهبود حداکثری کیفیت کاتالیست پس از تولید هر ۲۰۰۰ تن از کاتالیست آخرین شرایط واحد توسط کارشناسان فروشنده مورد بررسی قرار گیرد و در صورت نیاز تغییرات لازم در فورمولاسیون کاتالیست در تولید محموله بعد مدنظر قرار گیرد.

۳- فروشنده موظف است کلیه الزامات و آئین نامه‌های حمل و نقل جاده‌ای را رعایت نماید.

۴- برگه اطلاعات ایمنی مواد (MSDS) بر روی تمامی بسته‌های کاتالیست الصاق شود.

۵- شرکت/ فروشنده دارای گواهینامه ISO 14001 نسخه ۲۰۱۵ باشد.

۶- بسته‌بندی اصولی و استاندارد و در داخل کانتینر جهت جلوگیری از هرگونه انتشار به محیط رعایت گردد.

۷- مشخصات تکمیلی پیوست میباشد:

محل مهر خریدار:

محل مهر فروشنده:

# Technical Specifications for Supply of RFCC Catalyst

## 1- Introduction

Imam Khomeini Oil Refining Company (IKORC) invites sealed tenders from Approved Suppliers as per the product specifications, terms and conditions described in this document for 8000 ton (dry basis)\* of RFCC catalyst.

The Residue Fluid Catalytic Cracking (RFCC) unit with a design capacity of 94387 BPSD, is designed to process a blend of the treated residue from RCD, LVGO & HVS from VDU, and HGO from CDU2.

The purpose of this unit is to convert residue material into more valuable hydrocarbon products, such as propylene, cracked gasoline and so on. This is the main conversion unit of the Project. RFCC Unit is designed to perform "Maximum Gasoline Production" mode. RFCC Unit consists of three sections, i.e., Reactor-Regenerator and Flue Gas section, Main Fractionation section, and Gas Concentration section. Two stage regenerator technology with a catalyst cooler is adopted for the regenerator design. A Third Stage Separator is provided to remove the catalyst fines in the flue gas to meet the environmental regulation. The products from RFCC Unit are further processed and/ or treated by the downstream unit. LPG from the RFCC unit will be routed to LPG Merox unit and a downstream Propylene unit to manufacture polymer grade Propylene. The full range cat cracked, debutanized gasoline will be routed to the downstream Gasoline Hydrotreater to meet the Motor Gasoline Pool sulfur specifications. A part of LCO will be routed to a hydrotreater to be blended into the final diesel pool and a part will be used as a cutter stock for fuel oil pool.

The main objectives are:

- Run at design or higher throughput
- Run with design heavy feed containing 185m<sup>3</sup>/hr or higher treated VR
- Maximize gasoline yield; design or higher
- Maximize gasoline RON; design or higher.
- Design LPG yield with higher LPG olefin content
- Minimize dry gas yield and Slurry

Consider the following limited tender for purchasing the required catalyst including technical services and trainings as clarified in the following specifications.

\*Note: 10000 ton dry basis amount of catalyst is based on net dried (at 1000°C) weight of catalyst.

## 2- General Points

- In this tender the winner will supply 8000 tons of RFCC catalyst with the divided supply of two 5000 tons of catalyst with 6 month gap in between as per tender document specification.
- IKORC reserve the right to extend due date of tender, accept or reject any tender in part or full, without assigning any reason whatsoever.
- Each package shall be labeled indicating the Hazardous Nature, Brief Handling Procedure and Precautions to be followed.
- Test Certificate for physical and chemical properties and laboratory analysis are required with each batch of supply.
- On receipt of product, samples will be drawn for testing at our laboratory and if found to be in accordance with our specifications, the same shall be taken in to account.
- Bidder shall submit detailed information along with the offer regarding the direct/indirect impact of their product on people, equipment, environment and material etc. Material Safety Data Sheet to be submitted with the technical bid.
- The material shall be packed in accordance with the rule in weatherproof, shipment worthy eco-friendly packing, labeled and indicating clearly the description of item, hazardous nature if any and precautions/care to be taken.
- Offers and all correspondence must be in English language only.
- The commercial terms offered by the bidder should be firm, clear and specific as the tenders shall normally be finalized without seeking further clarification.
- Bidder to confirm that free replacement shall be made in case the material supplied is rejected.
- After documents evaluation, visiting three similar reference units and catalyst production plant would be necessary for final technical approval.
- Vendor to note that catalyst will be loaded at a time determined by IKORC. Guarantees will hold valid from the time whenever feedstock is introduced for the first time.
- Spent catalyst (E-Cat) should be safe for disposal as per international safety standards. Vendor shall specify the standard and detailed procedure.
- Prior to delivery of each batch of catalyst, in addition to submitting Certificate of Analysis and Certificate of Conformity, third party inspection should be done. Only after accepting third party inspection report by IKORC, delivery would be possible. Third party inspection report must include, but not limited, catalyst physical and chemical properties, packaging condition, appearance and labeling.

### **3- Pre-Qualification Technical Criteria**

- Bidder is required to submit 1 kg sample of each catalyst to IKORC. Samples are required to be submitted before the due date of tender, and after test will be kept as witness. Offer, without samples is liable to be rejected.
- The catalyst supplier shall be a catalyst manufacturer and should have supplied catalyst for RFCC to any refinery outside country of manufacturing plant in the immediate preceding 10 years from the date of this tender. Reference details including the catalyst performance report, contact detail and copy of the purchase order to be attached.
- The catalyst supplier shall provide minimum three reference units regarding successful and satisfactory performance of the offered catalyst(s) for the RFCC in units operating under similar conditions and same or better guaranteed performance outside country of manufacturing plant as below:
  1. Catalyst manufacturer must have 3 similar references which at least one of them should be won.
  2. Reference units must be outside the country of manufacturing plant (international experience)
  3. Supplied catalyst must be minimum 1000 ton for each PO
  4. Units catalyst inventory must be minimum 500 ton
  5. Units must have two stage regenerator
  6. The reference unit feed should be 0.94 specific gravity, 15 ppm metal, 4.5 wt% CCR
  7. The reference unit must run at design or higher throughput
  8. The reference unit E-Cat should contain minimum 5000 ppm metal

The references catalyst must have completed minimum one year of successful operation. Reference details including the feed/products quality, operating condition and catalyst performance report to be attached.

- IKORC may at its discretion seek the performance details of the supplier's catalyst(s) from end users with similar plants who are using the same catalyst technology, which is offered to IKORC. In the event of receipt of non-satisfactory performance, the catalyst(s) offered will deem to be technically disqualified and this offer will not be considered for further evaluation.

#### 4- Technical Evaluation Criteria

In the evaluation the catalyst should meet all condition including but not limited to feed and products specifications, reference units and operation condition in this document to be accepted.

Catalyst with better guaranteed performance and lower catalyst make up may gain more technical score and priority based on table 1. Minimum acceptable technical score is 70.

Offered prices will be corrected based on following formula:

$$L=[100\times C]/[100-[i\times[100-t]]]$$

*L: corrected price*

*C: offered price (in the envelop)*

*i: effective factor, for this case it is 0.4*

*t: technical score, which is proposal evaluation score based on table 1*

Commercial proposals will be compared based on corrected price.

**Table 1 Catalyst Technical Evaluation Items**

Item	Effectiveness%	Note
Similar Reference Unit	35%	Minimum 3 similar reference units Minimum one year of successful operation Reference unit details, contact information and catalyst performance report to be attached
Technical Support	30%	Technical services including customized procedures, catalyst manual, details of training, E-Cat analysis, providing performance report and regular site visit Technical abilities including providing technical documentation and two days RFCC seminar in IKORC before official date of tender to evaluate technical ability of catalyst supplier
Catalyst Performance	35%	Including catalyst make up, gasoline yield, RON and unit economy

## 5- Feed Properties

The RFCC unit processes a blend of following feeds.

- Treated Residue – 70.6 VOL%
- LVGO – 12.1 VOL%
- HVS – 11.1 VOL%
- HGO – 6.2 VOL%

**Table 2 Properties of RFCC Feed**

Feedstock	Treated Residue	LVGO	HVS	HGO	Blended	Test Method
Source Unit	RCD	VDU	VDU	CDU2	-	
TBP Cut Range, °C	320+	320-373	482-535	320-373		
Blended Ratio, Vol%	70.6	12.1	11.1	6.2	100.0	
Amount, BPSD	66,551	11,466	10,514	5,856	94,387	
Feedstock Properties						
Sp.Gr. (60°F/60°F)	0.952	0.878	0.957	0.896	0.9401	ASTM D-1298
Distillation (°C)						ASTM D1160
IBP		241	355	224	270	@ 760mmHg
10 vol%		287	468	317	322	
30 vol%		315	497	345	419	
50 vol%		333	513	364	520	
70 vol%		356	534	388	628	
90 vol%		382	-	421	655	
FBP		421	-	453	724	
Total Sulfur (wt%)	0.4	2.3	2.9	2.3	1.01	ASTM D-4294
Total Nitrogen (ppmw)	2100	1050	2600	1050	1976	ASTM D-4629
Conradson Carbon Residue (wt%)	6.0	-	1.5	-	4.45	ASTM D-189
Ni (ppmw)	8.0	-	2	-	5.9	UOP-391
V (ppmw)	11.8	-	3	-	8.7	UOP-391

## 6- Products Properties (must guarantee)

- The following operating conditions and feed quality and, the Warranted product yields will be the basis for penalty and liabilities for those conditions and properties.
- The supplier should agree to the above and promise to provide a performance warrantee on the same
- Arak will conduct test-run once the catalyst changeover is completed. The test run will be conducted for the above unit conditions to achieve the warranted product yield. In case the warranted yield is not matched, Arak can give one/two opportunities to the supplier to re-blend the catalyst.
- The following liabilities are on the supplier in case the warranted product yield is not achieved.

**Table 3 Product Quality and Quantity**

Item	Unit	Expect value	Estimated by catalyst vendor
Feed Capacity	BPSD m3/hr	94387 625.3	
RFCC Gasoline Yield	wt %	44.79*	
Desired	wt %	Max.**	
LPG Yield	vol %	-	
Propylene Yield	wt %	4.9**	
RFCC Gasoline Properties			
RON	-	94	
Aromatic	vol %	27.1	
Olefin	vol %	33.4	
C4	mol. %	1	
Sulfur	ppm	1000	
LCO	vol %	-	
Sulfur in LCO	wt %	0.69	
Coke	wt %	7.5***	
Slurry	vol %	-	
Dry Gas	wt %	**	
Catalyst Consumption	ton/day	25 max	

\* Based on 221°C Gasoline FBP

\*\* The maximum possible operating yield based on exist pump and compressor are mentioned on table4

\*\*\* SUPPLIER Design Value

**Table 4 Operating Conditions**

Item		Design Operating Condition	Estimated by Catalyst Vendor
<b><i>Reactor</i></b>			
Feed rate	m <sup>3</sup> /hr	625.3	
Feed preheat temperature	deg C	232	
Riser outlet temperature	deg C	532	
Reactor pressure	barg	1.7	
<b><i>Regenerator</i></b>			
Combustion air	KNm <sup>3</sup> /hr	468	
Regenerator pressure	barg	2.4	
Dense bed temperature (max)	deg C	710 (739)	
Delta Coke	wt. %	-	
Catalyst Addition	kg/kg Feed	-	
Coke burning rate	kg/hr	-	
Catalyst Circulation Rate, max	ton/hr	5000	
Catalyst Oil Ratio		-	
Catalyst Inventory	Ton	1500	-
E-Cat Metal	ppm	-	
Target E-Cat Activity		69	
<b><i>The design operating conditions</i></b>			
Wet gas compressor flow	KNm <sup>3</sup> /h	125	
RFCC Gasoline Yield	Nm <sup>3</sup> /h	326	
LPG Yield	Nm <sup>3</sup> /h	186	
Propylene Yield	WT%	4.9	
Dry Gas	KNm <sup>3</sup> /h	46	

**7- Required Information**

**Table 5 General Catalyst Data**

		Catalyst Type		Fresh USY Zeolite Catalyst	
No.			Specification	Required: 8000 MT	
1	Catalyst Property	Physical Properties	Bulk density A.B.D	0.70 - 0.80 gr/cc	
2			Particle size distribution PSD	A.P.S	70 - 85
3				P.S.D 0-20 microns	Max 2.0 wt%
4				P.S.D 0-40 microns	5-15wt%
5				P.S.D 20-40 Microns	To be reported
6				>=105 Microns	<=35 wt%
7				Attrition Resistance(CAI)*	5 ± 2
8				Surface Area (m <sup>2</sup> /gr)	260±30
9				Fresh Zeolite / Matrix* Surface Area Rated	To be reported
10				Pore Volume(ml/g)	0.3-0.5
11				Unit Cell Size(Angstrom)	To be reported
12				Thermal stability	To be reported
13				Pore distribution (strippability)	To be reported
14				Micro Activity MAT(ASTM D-3907/D-5154) or ACE / FST	82± 3
15	Catalyst Property	Chemical Properties	Chemical Analysis	Matrix activity & porosity	To be reported
16				Loss on Ignition	To be reported
17				Al <sub>2</sub> O <sub>3</sub> (wt%)	To be reported
18				Rare Earth Oxides (wt%)	To be reported
19				Zeolite content/ silica to alumina ratio	To be reported
20				ZSM5	To be reported
21				Additives (CO Promoter,...)	None
22				Sodium Content (Na <sub>2</sub> O)	To be reported
23				SO <sub>4</sub>	To be reported
24				Impurities	V (DB%)
25			Ni (DB%)		To be reported
26			Ni+V		To be reported
27			Metals resistance		10000 ppm in E-Cat
28			Fe		To be reported
29	Performance Forecast	Conversion	Gasoline Yield (wt%)	Max.	
30			LPG	To be reported	
31			Gas Factor	To be reported	
32			Coke Factor/ Coke selectivity	Low	
33			Gasoline RON	Max.	
34	Unit Conditions	Operating Regen. Dense bed temperature (max)°C	710 (739)		
35		Reactor Temp. °C	532		
36		Catalyst Make Up	To be reported		
37		Catalyst inventory	1500 tons		
40	Technical Support	Technical & Customer Services(Training)	Required		
41		User & Reference List (company name & country & year & address)	Required		
42		Practical Background	Required		

\*Catalyst attrition to be in the acceptable range for controlling catalyst circulating lost

\*\* Matrix must contain Nickel and Vanadium trap to maximize catalyst stability

\*\*\*The items that the figures are requested as to be reported will be used as the technical score for bid evaluation

**Table 6 Specification of Proposed Catalyst**

<b>Item</b>	<b>Value</b>	<b>Test method</b>
MAT /ACE WITH CPS conversion <sup>*</sup> , %wt		ASTM D7964/7206
Total SA, m <sup>2</sup> /g		ASTM D3663-99
Zeolite SA, m <sup>2</sup> /g		
Zeolite Unit Cell Size, Angstrom		
Pore Volume, cc/g		
ABD, g/cc		ASTM D4512-99
PSD, % w :		ASTM D4464
0-20 microns		
0-40 microns		
APS, μm		ASTM D4464
Alumina Oxide, % w (Dry Basis)		XRF
Sodium, % wt (Dry Basis)		ASTM D1977-98
Rare Earth Oxide, % w (Dry Basis)		XRF
SO <sub>4</sub> , % w (Dry Basis)		
LOI, % w		
Attrition Index		ASTM D5757-00/jet cup

**Table 7 Estimated E-Cat Specification**

<b>Item</b>	<b>Proposed Catalyst by vendor</b>	
	<i>Unit</i>	<i>Value</i>
MAT conversion	wt%	
Total SA	m <sup>2</sup> /g	
Pore Volume	cc/g	
ABD	g/cc	
0-20 microns	% w	
0-40 microns	% w	
APS	μm	
Fe	ppm	
Ni	ppm	
V	ppm	
Na	ppm	
Coke Factor	% w	
Hydrogen Factor	% w	

This table to be completed by catalyst vendor for their acceptable range of their withdrawn Ecat.

## **8- PERFORMANCE GUARANTEES**

### **8.0 Guarantee Basis**

The guarantee agreement which would be provided to IKORC establishes the relationships and obligations of each party concerning Supplier's warranties for the catalyst makeup and performance. The agreement defines the mechanism whereby the various performance tests will be conducted, the guaranteed product qualities and catalyst consumption, and limitations concerning the period of time over which performance tests may be conducted. The results of these performance tests will be used to determine the conformance of the catalyst performance based on Supplier's guarantees.

Supplier takes guarantees very seriously, particularly for catalyst performance and makeup rate where it typically has high impact on the products yields and actual condition of the unit, including the catalyst circulation, lost and high coke yield. As will be discussed in Section 8.3, Supplier is particularly concerned about the cause of operational problems and the condition of the reactor and regenerator internals coming from catalyst.

Termination of this agreement is determined by either IKORC's acceptance (based on the results of the performance tests) or the payment of liquidated damages by Supplier in settlement for non-conformance of guarantees. The amount of these liquidated damages are directly related to the extent to which the guarantees were not met based on following liability formulas.

### **8.1 Product Performance Test Guarantees**

For determination of IKORC, the product performance test results, Supplier will guarantee that the proposed catalyst will produce the products meeting the following specifications (averaged over the seven day product performance test period):

- a) Gasoline yield = higher than or equal to 44.8wt% (plus or minus 0.5wt%)
- b) Propylene yield = higher than or equal to 4.9wt% (plus or minus 0.5 wt%)
- c) Coke make = less than or equal to 7.5wt%

The "plus or minus" value associated with the above figures guarantee is due to the allowable variance in the repeatability and reproducibility of the test run results.

### **8.2 Liability for Failure of Product Performance Test**

If the catalyst performance fails to meet the product performance test guarantees defined in Section 6, Supplier will provide IKORC with an amount of replacement catalyst in proportion to the extent to which such guarantees have not been met. The replacement catalyst shall be furnished at no cost to IKORC, ex-works the point of manufacture of the catalyst.

Fulfillment of Supplier's obligation regarding the product performance guarantees shall be determined by the following formulas:

$$C1 = \frac{\text{Actual Gasoline Yield (wt - \%)}}{\text{Guaranteed Gasoline Yield (wt - \% )}}$$

and,

$$C2 = \frac{\text{Actual Propylen Yield (wt - \%)}}{\text{Guaranteed Propylen Yield (wt - \% )}}$$

and,

$$C3 = \frac{\text{Actual Gasoline RON}}{\text{Guaranteed Gasoline RON}}$$

In the event that either of the product guarantees specified in Section 6 is not met (defined as C1 or C2 or C3<1), Supplier will provide IKORC with replacement catalyst for that particular product guarantee per the following catalyst replacement formula:

Catalyst replacement = ((0.65 -(0.5×C1 + 0.1× C2 + 0.05× C3)) (Total quantity of catalyst purchased)

### **8.3 Catalyst Consumption Guarantee and Liability**

Similar to the product performance guarantee, if the catalyst makeup rate fails to meet this catalyst performance guarantee, Supplier will provide IKORC with an amount of replacement catalyst which is in proportion to the extent to which the guarantee was not met. The replacement catalyst shall be furnished at no cost to IKORC, ex-works the point of manufacture of the catalyst.

Fulfillment of Supplier's obligation regarding the catalyst makeup rate guarantees shall be determined by the following formula:

$$C4 = \frac{\text{Guaranteed catalyst Consumption(T/D)}}{\text{Actual catalyst Consumption(T/D)}}$$

In the event that the catalyst consumption guarantee is not met (defined as C4<1), Supplier will provide IKORC with replacement catalyst per the following catalyst replacement formula:

Catalyst replacement = 0.1×(1-C4) (Total quantity of catalyst purchased)

### **8.4 Total Liability**

Supplier's total catalyst liability for the IKORC catalyst performance and makeup is limited to the sum of the catalyst replacements calculated in the above Sections 8.2 and 8.3, but in no case shall it exceed 20% of total catalyst price.

## **9- Penalty**

The real catalyst consumption to reach the proposed RFCC yields and performance comparing with Supplier proposal figures would be the basis for the supply of additional free of charge amount of catalyst which is clarified on previous items.

## **10- Other Required Documents and Information**

### **1- Delivery time**

24 weeks from order and receipt of advances payments in our account with the divided supply of two 10000 tons of catalyst with 6 month gap in between

### **2- Shelf life**

Three years to be considered for the catalyst shelf life.

### **3- Liquidated damages**

In case of late delivery, 0.5% per week with a maximum of 5% of the value of non-delivered catalyst to be deducted from corresponding invoiced value.

### **4- Required Packing Details**

20 feet sea bulk container which can contain 18 tons of catalyst. Containers should have flange and attachment device compatible to unit loading device. Containers price to be considered in catalyst price.

Dimensions approximately: 6.1 m L × 2.4m W × 2.6m H

### **5- Technical proposal should contain following items**

- Invoice
- Packing list
- Reference list of RFCC catalyst consumer including description of units and operating data
- Certificate of Compliance
- Certificate of Analysis
- Catalyst performance guarantee based on design condition
- ACE / FST device specification and detail should be mention in proposal
- QC and QA certificates
- Details of performance guarantees and compensation

### **6- Free Required Technical Service (should be mentioned in proposal)**

1- Detailed and customized catalyst operating including but not limited to startup, shut down, emergency and troubleshooting procedures and manual.

2- Training to be considered for 10 process engineers and operators in catalyst manufacturing plant and one of RFCC catalyst consumer with total duration of two weeks for controlling catalyst performance and all the relevant charges to be considered in catalyst price.

3- Catalyst manufacturer shall provide 5 days RFCC training course in IKORC.

4- Weekly E-Cat full analysis.

5- Quarterly feed and products full analysis.

- 6- Review and analysis unit operating data and provide monthly unit monitoring report and heat/mass balance calculation (including spreadsheet file).
- 7- Quarterly technical service team site visit and provide comprehensive performance and optimization report. Vendor shall provide technical assistance for troubleshooting arising in the unit till the catalyst is in use even after the guarantee period exceeds.
- 8- For catalyst specification approval, catalyst manufacturer approved test method and test details to be issued.
- 9- Third party inspection.

## **11- User Reference List**

Catalyst manufacturer must have at least three international user references and provide catalyst performance report for evaluation. Reference units must have these criteria:

- Catalyst manufacturer must have 3 similar references which at least one of them should be won based on back to back trial
- Reference units must be outside the country of manufacturing plant (international experience)
- Supplied catalyst must be minimum 1000 ton for each PO
- Units catalyst inventory must be minimum 500 ton
- Units must have two stage regenerator
- The reference unit feed should have minimum 0.94 specific gravity, 15 ppm metal (Ni+V), 4.5 wt% CCR
- The reference unit must run at design or higher throughput
- The reference unit E-Cat should contain minimum 5000 ppm metal (Ni+V)

## **12- Mandatory separated offer**

This item to be offered in detailed technical and commercially with separated price.

### **SOx additive**

200 tons catalyst additives for removing 50% of SOx from RFCC flue gas ( 1700 PPM SO<sub>2</sub>) for 1500 ton catalyst inventory and one month operation and the relevant loading device to be considered. (Dosage Rate: 3 ton per day)

### **Gasoline sulfur reduction additive**

400 tons additive for removing 50% sulfur in gasoline product (1200 PPM Design Gasoline Sulfur and 750 PPM Normal gasoline Sulfur) for 1500 ton catalyst inventory and one month operation and the relevant loading device to be considered. (Dosage Rate: 6 ton per day)

### **ZSM5**

- 200 tons ZSM5 as LPG propylene production promoter and the relevant loading device to be consider. (Dosage Rate: 3 tons per day)

-----  
 Another alternative that the blend of above 3 additives about 800 tons ( summation of above figures) with a single loading and mixing device (12 ton/day) is our preference.

For additives (flue gas DeSOx / gasoline sulfur reduction / ZSM5) payment terms, due to operational aspect and uncertainty, the additive performance base quality and yield prediction protocol including test methods, dosage and details of loading device (capacity, type,...) to be clarified in your offer. Based on your offer details, [ in which for each additive (Flue gas DeSOx/gasoline sulfur reduction /ZSM5), three separate offer and three separate price], three technical score will be achieved. The additive payment terms will be 100% against shipping documents and third party Inspection and those technical score will be implemented in additive prices (Same as catalyst price). The offered protocol and basis will be the implemented for calculating the performance penalties.

- 1- The Additives mandatory items as per following specifications and loading devices with the following details to be clarified in the offer with **separate optional price.**

**SOx additive**

200 tons catalyst additives ( in 20 tons sea bulk containers, same as catalyst packing) for removing 50% of SOx from RFCC flue gas ( 1700 PPM SO2) for 1500 ton catalyst inventory and one month operation and the relevant loading device as per following specifications to be considered. (Dosage Rate: 3 ton per day)

Table – specifications of DeSOx FCC Additive

Item	Units	Value
ABD	g/cc	0.8-0.90
Total surface Area	m <sup>2</sup> /g	>
Attrition Index	wt%	<
PSD:		
0-20 μ	wt%	<
0-40 μ	wt%	<
0-150 μ	wt%	>90
Dosage	T/day	<

**Gasoline sulfur reduction additive**

400 tons additive ( in 20 tons sea bulk containers, same as catalyst packing ) for removing 50% sulfur in gasoline product (1200 PPM Design Gasoline Sulfur and 750 PPM Normal gasoline Sulfur) for 1500 ton catalyst inventory and one month operation and the relevant loading device as per following specifications to be considered. (Dosage Rate: 5 ton per day)

Table – specifications of GSN Sulfur Reduction FCC Additive

Item	Units	Value
ABD	g/cc	0.7-0.80
Pore Volume	cc/g	>
Total surface Area	m <sup>2</sup> /g	>
Attrition Index	wt%	<
Na <sub>2</sub> O(dry basis)	wt%	<
RE <sub>2</sub> O <sub>3</sub>	wt%	>

<b>PSD:</b>		
<b>0-20 μ</b>	wt%	<
<b>0-40 μ</b>	wt%	<
<b>APS</b>	μ	70-90
<b>Dosage</b>	T/day	<

### ZSM5

200 tons ZSM5 ( in 20 tons sea bulk containers, same as catalyst packing) as LPG propylene production promoter and the relevant loading device as per following specifications to be considered. (Dosage Rate: 3 ton per day)

Table – specifications of ZSM5 FCC Additive

<b>Item</b>	<b>Units</b>	<b>Value</b>
<b>Na<sub>2</sub>O(dry basis)</b>	wt%	<
<b>LOI (800C /1 hr)</b>	wt%	<
<b>Pore Volume</b>	cc/g	>
<b>Total surface Area</b>	m <sup>2</sup> /g	>
<b>ABD</b>	g/cc	0.7-0.85
<b>MAT Conversion</b>	wt%	>
<b>Attrition Index</b>	wt%	<
<b>PSD:</b>		
<b>0-20 μ</b>	wt%	<
<b>0-40 μ</b>	wt%	<
<b>0-150 μ</b>	wt%	>
<b>APS</b>	μ	65-80
<b>Dosage</b>	T/day	< 3

In case of good performance of each of above additives the additional batch of each additive will be ordered based on the winned price.

#### **Additive Loading Device Specifications: (Mandatory item)**

For above 3 additives about 800 tons ( summation of above figures) **Two parallel loading and mixing device**(10 ton/day for each one with turn down ratio 50%, 1 operating and 1 spare) as per attached UOP spec. and drawing to be considered in your offer **with separate optional price.**

### 13- Optional Offer

The technical offer must contain followings as optional item with separate price:

#### **Metal passivation**

- Additive for passivation of Nickel and Vanadium in the feed for 1500 ton catalyst inventory and one month operation
- Additive injection package to be considered
- Upon the passivation effectiveness the final purchase order will be submitted

#### **ACE device**

- ACE device including GC is required for bilateral catalyst performance checking.



