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درباره ما:

شرکتتراوشجم یک شرکت طراحی ومهندسی و پیمانکارکلیددردست (E.P.C.) پکیجهای یروسسی ایرانی در زمینه نفت، گاز و یتروشیمی ونیروگاهی است. شرکت تراوش جم دارای تجربه قابل توجه و دانش در طراحی و عرضه پکیجهای پروسسی كليددردست (.E.P.C) با مهندسی بالا و مهارت مديريت است شركت تراوش جم براى داشتن روابط محترم با مشتريان، اجراى مطمئن بروژه ، كارآمد و رفع نیازهای و الزامات کاملزیست محیطی شناخته شده است. شرکت تراوش جم به منظور توسعه مهارت ها و دانش فنی در ایران از نفرات متخصص در فن آوری های فرآیند در صنعت نفت، گاز ، پتروشیمی و نیروگاهی بر پایه استانداردها و نرم افزارهای روزدنیااستفاده میکند. شرکت تراوش جم می تواند از طریق مشارکت و اتحاد استراتژیک با صاحبان تکنولوژی وشركتهاى مشهور بين الملى به مشتريان اش طيف گستردهاى ازخدمات ديگر فرايندهاى پروسسی فرآهم کند. شرکت تراوش جم اهداف زیر رادارد: بهترین کیفیت /در زمان بندی مطلوب پروژه/قیمت مناسب /طراحی بر طبـق نیازهـای یروژه/ساخت استاندارد نفرات کلیدی شرکتتراوشجم در شرکتهای زیر دوره های اموزشی طی کرده اند: 1-Thyssen Krupp Stahl AG (Germany) 2- Deutsche Babcock (Germany) 3- Foster Wheeler (Spain)

4- I.H.I. (Japan)

5- J.S.W. (Japan)

شركت تر اوش جم خدمات و فعاليت ها ارائه ميكند:

- ارائه خدمات مهندسی پایه و تفضیلی
- تامین و فروش تجهیزات و ادوات نیروگاهی و پالایشگاهی وسکوهای نفتی
 - راه اندازی، اصلاح و بهینه سازی واحدهای پروسسی و نیروگاهی
 - ارایه پکیج های تخصصی به صورت کلید در دست(E.P.C)

-3-Uواحد پالايشگاه کوچك	U-2واحد احياي مجدد أمين وMEG	-1-Uواحد بازيافت گاز هاي ار سالي به فلر
3-Pپکیج کورہ	P-2پکيج بازيابي کاتاليست و فيلتر	1-¶پکيج فيلٽر هاي چند لايه آب نرم
P-6 پکیج تصفیه کندانسه	P-5پکيج تزريق شيميايي	4-4پکيج سوخت گازي
		P-7 پکیج خشك کن گاز
-3-E هوازدايي با گاز	-2-Eهوازداي تحت خلاء	-1-E هوازداي بخاري
-6-Eجدا كننده سه فازي	-5-Eديگ بخار بازيافت حرارتيHRSG	-4-Eزباله سوز
	-8-Eخنك كن نمونه اندازه گيري	-7-Eفيلتر رطوبتي گاز

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دمات قابل ارائه	تسرح خا



خدمات فنی و مهندسی

شرکت تراوش جم با جذب تکنولوژيهای برتر و به روز و نيز بکار گيری نيروهای متخصص داخلی و بر پايه استانداردهای روز دنيا در چهارچوب زمان بنديهای پروژه و با دانش فني لازم خدمات مهندسي مو رد استفاده در صنايع نفت و گاز و پتروشيمي و نيروگاهي ارائه ميکند.

- ۲- خدمات مهندسي بررسی طراحی پایهFront End Engineering
- ۲- خدمات مهندسي تفضيلي واحدهاى نفت ، گاز ، بتروشيمي و نيروگاهي؛
 - ۳- ارایه خدمات مشاوره و بهسازی عملکرد واحدهای پالایشگاه گاز؛
- ۴- ار ایه خدمات طر احی مقاوم سازی تأسیسات و تجهیز ات در مقابل زلزله؛
 - ۵- طراحي سيستم هاي بارگيري و تخليه سيالات نفتى و گازى
- ۶- ار ایه خدمات طر احی مخازن ذخیره، مبدل های حر ارتی، مخازن تحت فشار ،
 - ۷- طراحی و بهسازی عملکرد واحدهای بخار و دیگ بازیافت HRSG ؛
 - ۸۔ آموزش،
 - ۹- بررسی امکان بهره برداری و خطراتHAZOP ، بررسی ایمنیHSE
 - ۱۰- ار ایه خدمات، مشاور ه و نظارت: (MC)
 - نظارت بر طراحی،
 - نظارت بر خرید کالا
 - نظارت بر عملیات ساخت و راه اندازی،
 - راه اندازی، انجام آزمایش عملیاتی شدن و آزمایش عملکرد

فروش و تامین تجهیزات واحدهای پالایشگاهی، نیروگاهی و سکوهای دریایی میکشتار می انباعی ماه منعینیت گار می

شرکت تراوش جم انواع تجهیزات صنعت نفت و گاز و پتروشیمی و نیز پالایشگاهی را مطابق با استاندارد شرکت ملی نفت ایران، از سازنده های معتبر و به همراه گواهینامه مورد تایید تامین می نماید.

- تجهیز ات داخلی جداکننده سه و دو فازی
 - پمپ
 - پمپ تحت خلا
 - پمپ های دیافر اگمی سر چاهی
 - بند و بستهای خاص سرچاهی
 - اجكتور
 - ابزار دقیق
 - شیر کنترل
 - شیر اطمینان
 - توربين

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تعمیرات و بهینه سازی

شرکت تراوش جم بر پایه تجارب عملی و آشنایی با تجهیزات پروسسی اصلاح، بهینه سازی،تعمیرات اساسی و راه اندازی را انجام می-دهد و رفع اشکالات عملیاتی و یا پروسسی، ارائه آموزش و بررسی احتمالات خطر HAZOP را به انجام میرساند که برای واحدهای

- پروسسی زیر ارائه میشود:
- ۱- پروسس های گازی
- ۲- واحدهای دیگ بخار
- ۳- واحدهای دیگ بازیافت حرارتی(HRSG)
 - ۴– هوازدا بخاری
 - ۵- هوازدا تحت خلا
 - (Fine Filter) فيلتر چند لايه أب
 - ۷– فیلترها(کاتالیست،گاز،آب)
 - ۸– جداکننده ها
 - ۹- زباله سوزها
 - ۱۰– واحدهای امین و MEG
 - ۱۱- واحدهای خشک کن گاز(TEG)
 - ۱۲– واحدهای تصفیه آب
 - ۱۳- واحدهای آب شیرین کن





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U - ۱ - احاحد بازیافت گازهای ارسالی فلر



شــر کت تراوش جم یک پیمانکار EPC ایرانی برای طراحی و احداث واحد بازیافت گاز فلر می باشــد. این سیســتم با صرفه جویی در گاز ورودی فلر باعث کاهش انتشار CO2 و NOx می شود. این سیستم سازگار با محیط زیست باعث خواهد شد که طول همر مشعل فلر افزایش یابد.

مزايا:

- .صرفه جویی در مصرف گاز و انرژی
 - کاهش آلودگی
 - توليد برق و آب و بخار

روش های توصیه شده:

۱. اصلاح فرایند واحد برای حذف گاز ارسالی به فلر ۲. زباله سوز گازی با بویلر بازیافت حرارتی برای تولید بخار تا 20bar ۳. واحد شیرین سازی گاز با قابلیت تولید برق در ژنراتور گازی







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MEG – T – U – T – U – T – U



شرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و احداث واحد احیای مجدد امین و MEG می باشد. آمین و MEG در بخش عملیات گازی استفاده می شوند. با گذشت زمان این مواد فاسد خواهند شد و باعث وقوع برخی از مشکلات برای خطوط می شود. جایگزینی این مواد با مواد جدید هزینه بر بوده و باعث تعطیل شدن عملیات می شود. راه حل استفاده از واحد احیای مجدد آمین و MEG است. این راه حل یک روش جدید در جهان است و نیازی به تعطیل کردن عملیات تولید پالایشگاه، و یا خرید مواد پر هزینه و مواجهه با مشکلات دفن پسسماند نیست. واحد احیای مجدد آمین و MEG می تواند ثابت یا سیار باشد د بنابراین می توان برای بازگرداندن آمین و MEG، به طور مداوم و یا زمانی که مورد نیاز است این واحد استفاده می شود.









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U – ۳ –واحد پالایشگاه کوچک



شرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و احداث واحد پالایشگاه کوچک نفتی است. این واحد نفت خام/میعانات گازی/مازوت را به محصولات مفیدتری تبدیل میکند.واحد های طراحی شده در ظرفیت ۵۰۰۰۰ / ۱۰۰۰۰۰ / ۲۰٬۰۰۰ بشکه در روز در مدت ۱۲ ماه قابل تحویل بر روی شاسی می باشد.

طول عمر این واحد با احتساب ۱٫۶ میلی متر خوردگی مجاز حداقل ۱۵ سال می باشد .

مازوت	میعانات گازی	نفت خام	خوراک
گازوئيل، قير	گازوئیل، بنزین، نفت سفید	گازوئیل، بنزین، نفت سفید، قیر ، روغنهای روغنکاری	محصولات

• واحد تقطير اتمسفريک

در واحد تقطیر اتمسفریک (Atmospheric Distillation Unit) خوراک توسط فرآیند تقطیر به برشهای مختلف جدا می شود.

- واحد بهينه سازي بنزين
- اصلاح كاتاليستي (Catalytic Reformer Unit) يك واحد فرايند بهينه سازي بنزين اكتان بالا مي باشد.
 - واحد بازیابی گوگرد
 - اين واحد جهت بازيابي سولفور موجود در بنزين استفاده مي شود.
 - واحدهای سرویس جانبی
 - مخازن، هوای فشرده ، دیگ بخار و...







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۲ - ۲ - پکیج فیلترهای چند لایه آب نرم



شرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و ساخت پکیج های فیلتر چند لایه آب نرم می باشد. این فیلتر های چند لایه ای،برای حذف موجودات ریز و ذرات معلق در آب با بازده حذف تا ذرات بزرگتر از ۲µm استفاده می شود.

مزيت:

- راندمان بالای حذف ۹۸% ذرات تا اندازه ۲ میکرون
 - تامین جریان آب با دبی بالا
 - نياز كم به شستشو معكوس تجهيزات
 - هزينه پايين نگهداري

شستشوى معكوس فيلترهاى چند لايه

به منظور جلوگیری از افت فشـار فیلتر،آن را به صورت دوره ای از سـرویس خارج کرده وبا شستشوی معکوس،گل و لای فیلتر حذف می شـود.در شستشـوی معکوس، ابتدا با تزریق هوا بسـتر گل ولای شکسـته می شـود و سپس با گسـترش و یا با جریان سـیال ذرات گل و لای دربستر شناور شده و در هم شکسته می شوند و سپس با آب شستشو می شوند.













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P - ٤ - پکیج سوخت گازی



شـرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و سـاخت پکیچ سوخت گازی می باشد. بیشترین مصرف کنندگان سـوخت گازی نیـاز به گازی دارند که عاری از مایعات و جامدات باشـد.این حالـت مخصوصا در کاربردهای حساس مثل توربین گازی که اگر گاز فوق العاده تمیز و خشک نباشد ممکن است موجب بروز آسیب شدید به توربین شـود. سـوخت گازی به طور معمول در یک فشار عملیاتی ثابت و در دمای مطمئن مورد نیاز است. سوخت گازی تمیز بالاتر از هر دو نقطه تقطیر و دمای تشکیل هیدرات نگهداری می شود.

مزايا:

- افزایش اطمینان موتورهای گازی و توربین
- کاهش هزینه های تعمیر و نگهداری و خرابی برنامه ریزی نشده
 - افزایش بازیابی مایعات
 - بدون قطعات متحرک، کارکرد و نگهداری ساده



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شــرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و ســاخت پکیج تزریق مواد شیمیایی می باشد. این پکیج جهت وارد کردن مواد شیمیایی به واحدهای پروسسی ارائه می شود .

سيستم كامل شامل:

- سازه فلزی
- مغزن ذخيره مواد شيميايي
- پمپ های تزریق مواد شیمیایی (براساس 678 API)
 - ابزار دقيق
 - تابلو الكتريكي محلى
 - شير آلات
 - ستون كاليبراسيون
 - فيلتر
 - همزن
 - نوسانگير













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P - ۲ - پکیج تصفیه کندانسه



شرکت ترواش جم یک پیمانکار EPC جهت طراحی و ساخت پکیج پولیش میعانات بغار می باشد. در این واحد میعانات بغار (کندانسه) جمع آوری شده و سپس به عنوان آب تغذیه دیگ بغار استفاده می گردد. قبل از استفاده مجدد، میعانات باید تمیز شـود. بنابراین از پولیش دهنده میعانات بغار استفاده می شود که این دستگاه بخشـی از چرخه بغار است . این واحد با رزین های پلیمری پر می شـود که باعث حذف یا تبدیل یونها تا رسیدن به خلوص نزدیک آب مقطر می شود.

کاربردها:

- حذف ناخالصی های محلول (به عنوان مثال اکسید سیلیس و سدیم) و ذرات معلق (به طور مثال اکسید آهن) که باعث آسیب به دیگهای بخار، در ژنراتور بخاری ، راکتور و توربین می شوند.
- حذف مواد معدنی ای که اثر ثانویه در حفظ تعادل pH دارد. در واقع با حذف یون هایی که تمایل اسیدی دارند میزان خوردگی کاهش می یابد. این عمل میزان خوردگی که از تماس آب با فلز به وجود می آید را کاهش می دهد.
- واحد نفتگیر میعانات برای حذف هیدروکربن از میعانات بخار استفاده می شود که بنا بر درخواست مشتری ارائه میشود.











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E – ۱ – هوازدای بخاری



شرکت ترواش جم یک پیمانکار EPC ایرانی جهت طراحی و ساخت هوازدا بغار است.هوازدا (حرارتی و تحت فشار) برای حذف هوا و گازهای محلول از آب ورودی به دیگ های بغار استفاده میشود . دســتگاه هوازدا برای حذف اکســیژن تا سـطح 7ppb وزنی (یا کمتر) و حذف اساسی دی اکسید کربن طراحی شده است.

هوازدای سینی اسپری دار

شامل یک برج عمودی (یا افقی برای ظرفیت بالاتر از ۴۰۰ تن در ساعت) که مقدار خروجی ونت (vent)بخار را به حداقل می رساند

- هوازدای اسپری دار
- این نوع به برج نیاز ندارد و هزینه ساخت آن کمتر است .
 - هوازدای با پرکن (Packing)

مزايا:

- جلوگیری از خوردگی و تنش های حرارتی دیگ بخار.
 - افزایش بازده حرارتی.
 - فراهم کردن NPSH برای پمپ آب تغذیه.
- ذخیره آب هوازدایی شده (به مدت ۵ تا ۲۰ دقیقه)برای دیگ بخار.









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E - ‡ - زباله سوز



شــرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و ســاخت زباله سوز می باشد. از زباله سوز برای سوزاندن کامل گازهای زائد ســمی اســتفاده می شــود . این تجهیز می تواند برای سوزاندن کامل گاز فلر جایگزین سیستم فلر شود. زباله سوز قابلیت اضافه شدن به HRSG (دیگ بازیافت حرارتی) برای تولید بغار تا فشار 20bar را دارد.

مزايا:

- بازده احتراقی بالا
- تابش حرارتی پایین به محیط
 - توليد بخار تا ۲۰ بار
- کاهش هزینه های سوخت در مقابل تولید بخار

کاربردها:

- واحد نمک زدایی
- پالایشگاه گاز
- واحد تصفيه Tail Gas
 - پالایشگاه های نفت
- واحد های پتروشیمی
 - سيستم فلر











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E - ۲ - جدا کننده سه فازی (آب / گاز / نفت)



شــرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و ســاخت جدا کننده ســه فازی می باشد. جداکننده سه فازی برای جدا کردن آب، گاز و نفت طراحی شده است.جداکننده تجهیزی با اجزای داخلی می باشد که باعث تسهیل و بهبود فاز جداسازی می شود. با کمک ابزار دقیق و شیرهای کنترل اطلاعاتی دقیق در مورد عملکرد چاه نفتی ارائه می گردد.

ویژگی ها:

- جداکننده فشار بالا با مناسب ترین پوشش فلزی clad
- حداقل ppm آب در نفت و حداقل ppm روغن در پساب
- حذف شن و ماسه برای ارائه بهترین دوره های نگهداری









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E - ۷ - فيلتر رطوبتي گاز



شـرکت تراوش جم یک پیمانکار EPC ایرانی جهت طراحی و سـاخت فیلتر رطوبتی گاز می باشد. این تجهیز فناوری ای متشکل از فیلترینگ مواد جامد . انعقاد و جدایی می باشد.

اصول کارکرد تجهیز :

اولین قدم حذف آلاینده های جامد با استفاده از یک فیلتر کارتریج است. مواد جامد می توانند ثبات امولسیون را افزایش دهند و همچنین رطوبتگیر را مسدود و موجب کاهش کارایی شوند. در رطوبت گیری، قطرات مایع از هم جدا شده توسط لایه های رطوبتگیر با عملکرد بالا جذب می شوند. قطرات سپس از فیلتر های رطوبت گیر حرکت کرده (با منافذ به تدریج بزرگ تر) و به شـکل قطرات بزرگتر به هم آمیخته می شـوند. بعد از اینکه قطرات بزرگتر از فیلتر آزاد شدند، با گرانش در منطقه ته نشینی جدا می شوند.





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ار سازمانی	نمود



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، های انجـام شـده	پروژه



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ین شرکت به شرح ذیل می باشد :

سال اجرای پروژه	توضيح	کارفرما	نام پروژه	رديف
1891-1890	طراحی اصولی و تفضیلی	شرکت صدرا- فاز 22/24	Pig Launcher	١
1891-1890	طراحی اصولی و تفضیلی	شرکت صدرا- فاز17/18	Pig Launcher	٢
1891-1890	طراحی اصولی و تفضیلی	شر <i>کت</i> سازه- فاز ۱۲	Pig Launcher\Receiver	٣
1891-1890	پیمانکار E.P.C فیلتر های آب ۵۳۰ تن در ساعت	شركت صدرا- فلات قاره	Fine Filterرشادت	۴
1891-189+	پیمانکار .E.P.C پکیج هوازدای تحت خلاء ۱۰۶۰ تن در ساعت تا ۲ میکرون	شرکت کنترل قدرت- فلات قاره	طراحی و ساخت هوازدای تحت خلاء پروژه سیری	۵
1898-1892	پیمانکار .E.P.C پکیج بازیافت کاتالیست ألومینیوم تا ۱ میکرون	شركت فرادست فلات — ستاره خليج فارس	طراحی و ساخت Catalyst Recovery	۶
1898-1892	پیمانکار .E.P.C پکیج هوازدای تحت خلاء ۹۵ تن در ساعت	شرکت جهانپارس – شرکت مهندسی و توسعه نفت	طراحی و ساخت هوازدای تحت خلاء پروژه یادآوران	۷
١٣٩٣	پیمانکار .E.P.C پکیج های نمونه گیری سر چاهی با ۱۰۰ بار فشار	شرکت Sinopec و SSK چین - شرکت مهندسی و توسعه نفت	طراحی و ساخت No.19 Sample cooler پروژه یادآوران	٨
١٣٩٢	پیمانکار E.P.C. پکیج های نمونه گیری سر چاهی با ۴۰۰ بار فشار	شرکت Sinopec چین – شرکت مهندسی و توسعه نفت	طراحی و ساخت No.93 Sample cooler پروژه یادآوران	٩
1896	رفع عیوب و راه اندازی واحد بخار پتروشیمی کارون وطراحی سیستم کنترل (logic)	پتروشیمی کارون	راه اندازی واحد بخار و طراحی سیستم کنترل	۱۰
1894	تهیه مدارک -تکمیل طراحی- مدیرت نصب و راه اندازی	پالایشگاه تهران	نصب و راه اندازی اکونومایزر بویلر C	11

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	<i>نام:</i> حمید عابدین زادگان عبدی ^{تاریخ تولد: ۱۳۴۱}	
نام شرکت	سمت	سال
صنايع آذرآب	مدیر بخش طراحی مخازن	1378 -1288
فن آزمايان پوينده	رئیس هیئت مدیره و مدیر بخش طراحی و مهندسی	1840-1888
تراوش جم	مدیر عامل و مدیر بخش طراحی و مهندسی	۱۳۹۰- تا کنون

سابقه کار : ۲۳ سال

سابقه تحصيلات:

- فارغ التحصيل مهندسي مكانيك- گرايش حرارت و سيالات از دانشگاه صنعتي امير كبير- ١٣۶٧

دوره های آموزشی :

۱- طراحی تجهیزات و نیز سازه آنها تحت نظارت شرکت Krupp Industrietechnik آلمان- در آلمان

۲- طراحی مخازن و تجهیزات پالایشگاهی و پتروشیمی تحت نظارت شرکت JSW ژاپن - در ژاپن

۳- طراحی سازه های فلزی تحت نظارت شرکت IHI ژاپن - در تهران



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	نام: مهران سلیمانی تاریخ تولد : ۱۳۴۱	
نام شركت	سمت	سال
صنايع آذرآب	مدیر بخش طراحی process	1378 -1288
فن أزمايان پوينده	عضو هیئت مدیره و مدیر بخش طراحی processو مدیر پروژه ها	۱۳۷۷- تا کنون
تراوش جم	رئیس هیئت مدیره و مدیر پروژه ها	۱۳۹۰- تا کنون

س*ابقه کار :* ۲۳ سال

سابقه تحصيلات :

- فارغ التحصیل مهندسی مکانیک- گرایش حرارت و سیالات از دانشگاه صنعتی اصفهان - ۱۳۶۷

- فارغ التحصيل فوق ليسانس مهندسي مكانيك - گرايش تبديل انرژي از دانشگاه تبريز - ١٣٧٠

دوره های آموزشی : ۱- طراحی دیگ های بخار صنعتی تحت نظارت شرکت Deutsche Babcock آلمان- در آلمان ۲- طراحی حرارتی و فرآیندی دیگ های بخار تحت نظارت شرکت IHI ژاپن - در تهران

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_	<i>نام:</i> مجید عابدین زادگان عبدی	
	<i>تاريخ تولد :</i> ۱۳۴۰	
نام شرکت	سمت	سال
صنايع فاع	طراح پروسس	۱۳۶۵ تا ۱۳۶۶
شرکت ملی نفت	طراح پروسس	۱۳۶۶ تا ۱۳۷۲
بريتيش كلمبيا	کمک دانشیار و دانشجوی دکترا	۱۳۷۶ تا ۱۳۷۶
شرکت کانادایی GLE	مهندس ارشد پروژه- پروژه های شیرین سازی گاز و گازرسانی	۱۳۷۶ تا ۱۳۷۶
پژوهشگاه صنعت نفت	رياست پژوهشکده گاز	۱۳۸۲ ۵ ۱۳۷۸
فن أزمايان پوينده	رياست واحد طراحي پروسس	۱۳۸۹ ۵ ۱۳۸۳

سابقه تحصيلات :

- فارغ التحصيل مهندسي شيمي - دانشگاه صنعتي امير كبير - ١٣۶٥

فارغ التحصيل فوق ليسانس مهندسي شيمي - دانشگاه صنعتي امير كبير - ١٣۶٩

فارغ التحصيل دكترا مهندسي شيمي - گرايش(پتروشيمي) دانشگاه بريتيش كلمبيا كانادا - ١٣٧۶

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No.	Required For	Software	Application
1	Stationary Equipment	1.1- PV-ELITE 1.2- TANK 1.3- Aspen B-JAC 1.4- ANSYS	Pressure Vessel Mechanical design Fixed Roof Storage Tank Mechanical Design Heat Exchangers Mechanical Design Organization Design of Linear & Non-Linear Systems
2	Piping & Plant	2.1- Auto Pipe 2.2-CADWORX 2.3-PDMS	 a) 3-D Modeling b) Piping & Equipment Arrangement c) Stress Analysis d) Piping Isometrics Generation e) Bill of material
3	Civil & Steel Structure	3.1- SAP 2000 3.2- ETABS 3.3- SAFE 3.4- STAAD III	Dynamic & Static Analysis of Structures Non-Linear Structures & Buildings Design Foundation Design Structural Design
4	Process	4.1- HTRI 4.2- Aspen HTFS 4.3- Olga 6.0 4.4- PvtSim 18	 Thermal Design of : Oil & Gas Plant Fired Heaters Shell & Tube Heat Exchangers Air Coolers Boilers
5	Project Control	5.1- PRIMAVERA 5.2- MS PROJECT	a) Project Planningb) Project Schedulingc) Project Controllingd) Reporting
6	Drafting	6.1- AUTOCAD 2008 6.2- AUTOCAD P&ID	For Drafting (Mainly 2-D) For P&ID Drafting
7	General	7.1- WINDOWS XP& Vista7.2- MS OFFICE	 Microsoft Word Microsoft Excel Microsoft Power Point Microsoft Access
8	Boiler Design		IHI & FW, BOILER PROCESS & BASIC DESIGN AND FUNCTIONAL DESIGN SOFTWARE AND PROCEDURES.
9	Deaerator Design		In-House Software, Based on Crane Company's Procedures
10	Storage Tanks (Fixed & Floating Roof)	COADE TANK 3.1	For Mechanical Calculation Storage Tanks
11	Electrical Design	ETAP 6	For Electrical Design
12	Others		In-House Software for Tower Diameter, Safety Valve & Control Valve Sizing, Pressure Drop Calc., etc.



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No.	Device	Туре	Description	Qty.
1	Computer	Pentium 4 / 2.4 GHZ	CD drive 52, CDRWNec9400A HDD 40, Monitor 17" LG Flat, 2GB RAM	8
2	Computer	Pentium 4 / 3000 GHZ Athlou 64	DVD CD Rom, RW, HDD 120, monitor LG 17" Flat, VGA. RADEON 7000, 64mb, 2GB RAM	1
3	Computer	Core 2 DUO3	DVD RW, HDD 500, 4Gb Ram	2
4	Note Book	Acer Pentium 4, Intel inside	2GB mb DDR. SD Ram DVD. CD. RW	3
5	Note Book	Sony Vaio GRZ 660	DVD RW.CD. 512 mb DD Ram	2
6	Note Book	HP Pentium 4 Processor	Pavilion zx 5000 ea	1
7	Note Book	Toshiba MK 4021	DVD. CD Rom/HDD	4
8	Note Book	Compaq 716EA	DVD Rom	1
9	Note Book	Fujitso Siemens Esprimo V5505	Dual core 1,6 GHZ Ram 1 GB/HDD 160 GB/DVD RW	4
10	Note Book	Fujitso Siemens Esprimo V6505	Core2DUO 2 Ram 265 GB/HDD 250 GB/DVD RW	8
11	Printer	HP Color Laser jet 5500-A3 COLOR		1
12	Printer	HP Color Laser jet 5200-A3		1
13	Printer	HP 2014		2
14	Printer	HP 1100		1
15	Printer	HP 1200		1
16	Printer	HP 1300		1
17	Printer	HP 1320		2
18	Printer	SAMSUNG A4 COLOR		2
19	Copy Machine	Canon ir1600 A3		1
20	Copy Machine	Sharp SF 7370		1
21	Scanner	HP A4 2100		1
22	Scanner	HP A4 2400		1
23	Scanner	HP A4 5590		1
24	Scanner	HP A4 2400		1
25	Scanner	HP A4 5590		1




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Process

API 12J	Specification for Oil and Gas Separators (Note: Main separation, dehydration and desaltors to be based on Vendor design and guarantee.)
API 14 C	Analysis, Design, Installation and Testing of Basic Surface Safety Systems for Offshore Production Platforms.
API RP 14E	Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems
API RP 14J	Recommended Practice for Design and Hazard Analysis for Offshore Production Facilities
API RP 520	Sizing, Selection and Installation of Pressure Relieving Systems in Refineries, part 1 and 2
API RP 521	Guide for Pressure Relieving and Depressuring systems
DnV RP C202	Recommended Practice for relief, depressuring and disposal systems
NACE RP0475-98	Recommended practice for control of internal corrosion in steel pipelines and piping systems

Mechanical

API 2C	Specification for Offshore Cranes
API 9A	Specification for wire rope
API RP 11PGT	Recommended Practice for Packaged Combustion Gas Turbines
API Std 560	Fired Heaters for General Refinery Service
API Std 610	Centrifugal Pumps for General Refinery Service
API Std 613	Special purpose gear unit for refinery services.
API Std 614	Lubrication sealing and control oil systems for special purpose Applications
API Std 615	Sound control of mechanical equipment for refinery service
API Std 616	Gas turbine for refinery service.
API Std 617	Centrifugal compressors for general refinery service
API Std 660	Shell and Tube Heat Exchangers for General Refinery Service
API Std 661	Air cooled Exchangers for General Refinery Service
API std 662	Plate and Frame Heat Exchangers
API Std 670	Vibration, axial position and bearing temperature monitoring
API Std 671	Special purpose coupling for refinery service
API Std 674	Positive displacement pumps - reciprocating
API Std 675	Positive displacement pumps – Controlled volume
API Std 676	Positive Displacement pumps - rotary
API Std 682	Shaft sealing systems for centrifugal and rotary pumps
API Std 1581	Specification and Qualification Procedures for Aviation Jet Fuel Filter / Separators
ASME VIII	Pressure vessel codes divisions 1 and 2
ASME PTC-10	Power Test Code – Compressors and exhausters
ASME PTC-22	Performance Test Code – Gas Turbine Power Plants



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Piping

API std 1104Specification for welding of pipelines and related facilitiesAPI 5LSpecifications for line pipeAPI 6DSpecification for pipeline valves (gate, plug, ball and check valves)API 6DSpecification for fire test for valvesAPI 590Steel line blanksAPI 594Wafer-type check valvesAPI 600Steel gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 601Steel gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 602Compact design carbon steel gate valves for refinery useAPI 603Lug- and wafer-type butterfly valvesASME B1.0Pipe threads general purposeASME B1.0Pipe threads general purposeASME B16.5Pipe flanges and flanged fittings (NPS ½ through NPS 24)ASME B16.10Face-to-face and end-to-end dimensions of valvesASME B16.20Metallic gaskets for pipe flanges – Ring joint, Spiral-wound and JacketedASME B16.21Non metallic flat gasket for pipe flangesASME B16.34Valves - Flanged, threaded and welding endsASME B16.35Buttwelding endsASME B16.36Steel Orifice FlangesASME B16.37Valves - Flanged, threaded and welding endsASME B16.38Steel Orifice FlangesASME B16.34Valves - Flanged, threaded and welding endsASME B16.35Buttwelding endsASME B16.36Steel Orifice FlangesASME B16.47Large diameter steel flanges (NPS 26 through NPS 60)ASME B18.2Square, hexagonal bolts and nutsASME B13.3
API 5LSpecifications for line pipeAPI 6DSpecification for pipeline valves (gate, plug, ball and check valves)API 6FASpecification for fire test for valvesAPI 590Steel line blanksAPI 594Wafer-type check valvesAPI 598Valve inspection and testingAPI 600Steel gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 600Steel gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 600Ede gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 600Lug- and wafer-type butterfly valvesAPI 607Fire test for soft-seated quarter-turn valvesAPI 609Lug- and wafer-type butterfly valvesASME B1.1Unified inch screw threadsASME B1.20.1Pipe threads general purposeASME B16.5Pipe flanges and flanged fittings (NPS ½ through NPS 24)ASME B16.9Factory-made wrought steel buttwelding fittingsASME B16.10Foreged fittings, socket-welding and threadedASME B16.21Non metallic flat gasket for pipe flangesASME B16.25Buttwelding endsASME B16.34Valves - Flanged, threaded and welding endsASME B16.35Steel Orifice FlangesASME B16.47Large diameter steel flanges (NPS 26 through NPS 60)ASME B16.47Large diameter steel flanges (NPS 26 through NPS 60)ASME B18.1Chemical Plant and Petroleum Refinery PipingASME B31.3Chemical Plant and Petroleum Refinery PipingASME B31.4Pipeline transportation systems fo
API 6DSpecification for pipeline valves (gate, plug, ball and check valves)API 6ASpecification for fire test for valvesAPI 590Steel line blanksAPI 594Wafer-type check valvesAPI 598Valve inspection and testingAPI 600Steel gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 602Compact design carbon steel gate valves for refinery useAPI 607Fire test for soft-seated quarter-turn valvesAPI 609Lug- and wafer-type butterfly valvesASME B1.1Unified inch screw threadsASME B1.5Pipe threads general purposeASME B16.5Pipe flanges and flanged fittings (NPS ½ through NPS 24)ASME B16.10Face-to-face and end-to-end dimensions of valvesASME B16.20Metallic gaskets for pipe flanges – Ring joint, Spiral-wound and JacketedASME B16.21Non metallic flat gasket for pipe flangesASME B16.34Valves - Flanged, threaded and welding endsASME B16.35Steel Orifice FlangesASME B16.36Steel Orifice FlangesASME B16.31Chemical Plant and Petroleum Refinery PipingASME B16.34Valves - Flanged, threaded and mutsASME B16.34Pipeline transportation systems for liquid hydrocarbons and other liquidsASME B31.3Chemical Plant and Petroleum Refinery PipingASME B31.8Gas transmission and distribution piping systemASME B31.8Gas transmission and distribution piping system
API 6FASpecification for fire test for valvesAPI 590Steel line blanksAPI 594Wafer-type check valvesAPI 598Valve inspection and testingAPI 600Steel gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 601Steel gate valves - Flanged and butt-welding ends, bolted and pressure seal bonnetsAPI 602Compact design carbon steel gate valves for refinery useAPI 603Fire test for soft-seated quarter-turn valvesAPI 604Lug- and wafer-type butterfly valvesASME B1.1Unified inch screw threadsASME B1.20.1Pipe threads general purposeASME B16.5Pipe flanges and flanged fittings (NPS ½ through NPS 24)ASME B16.9Facctory-made wrought steel buttwelding fittingsASME B16.10Face-to-face and end-to-end dimensions of valvesASME B16.20Metallic gaskets for pipe flanges – Ring joint, Spiral-wound and JacketedASME B16.21Non metallic flat gasket for pipe flangesASME B16.25Buttwelding endsASME B16.34Valves - Flanged, threaded and welding endsASME B16.35Steel Orifice FlangesASME B16.47Large diameter steel flanges (NPS 26 through NPS 60)ASME B16.47Large diameter steel flanges (NPS 26 through NPS 60)ASME B13.3Chemical Plant and Petroleum Refinery PipingASME B31.4Pipeline transportation systems for liquid hydrocarbons and other liquidsASME B31.8Gas transmission and distribution piping systemASME B36.10MCarbon steel pipe
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ASME B31.8Gas transmission and distribution piping systemASME B36.10MCarbon steel pipe
ASME B36.10M Carbon steel pipe
ASME B36.19M Stainless steel pipe
ASTM ASTM standards Iron and steel products (various volumes)
BS 1560 Spiral wound gaskets for steel flanges
BS 1873 Steel globe and globe stop and check valves (flanged and butt-welding ends) for the
netroleum netrochemical and allied industries
BS 5351 Steel ball values for the petroleum petrochemical and allied industries
bio 5551 Stori ouri varvos for are perforeani, performentar and antea industrios
BS 5352 Steel wedge gate, globe and check valves 50 mm and smaller for the petroleum,
petrochemical and allied industries
BS 6755 Part 1Testing of valves - Specification for production pressure testing requirements
BS 6755 Part 2 Testing of valves - Specification for fire type-testing requirements
ISO 10474 Steel products - inspection documents
MSS SP-75 Specification for high test wrought butt welding fittings



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Pipelines

ISO 3183-3	Steel Pipe for Pipelines – Class C
ISO 15590-1	Induction Bends, Fittings and Flanges for Pipelines Part 1: Induction Bends
BS 4515	Welding of Steel Pipelines on Land and Offshore
BS 8010 Part 3	Code for Practice for Pipelines
BS 8010 Part 4	Pipelines on land and subsea: Operations and maintenance
DNV RP B401	Cathodic Protection Design
API 6D	Specification for Pipeline Valves, End Closures, Connectors and
	Swivels, 1994
ASME B31.4	Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous
	Ammonia and Alcohol
ASME B31.8	Gas Transmission and Distribution Systems
MSS SP-44	Steel Pipeline Flanges
MSS SP-75	Specification for high test wrought butt welding fittings
AFNOR 49-711	Steel Tubes External Coating with three layers Polypropylene layers. Application be
	extrusion

Safety and Environmental

IP15	IP model code of safe practice, part 15, area classification code for petroleum installations
ICAO	International Civil Aviation Organisation, annex 14 to the convention on international civil
	aviation aerodromes
CAP 437	Offshore Helicopter landing areas - guidance on standards, Civil Aviation Authority
SOLAS	Safety Of Live At Sea convention, International Maritime Organisation
API RP 14G	Fire Prevention and Control on Open Type Offshore Production Platforms
NFPA 10	Standard for portable fire extinguishers
NFPA 11	Standard for low expansion foam
NFPA 11A	Standard for Medium- and High-Expansion Foam Systems
NFPA 12	Standard on Carbon Dioxide Extinguishing Systems
NFPA 13	Installation of Sprinkler Systems
NFPA 15	Standard for Water Spray Fixed Systems for Fire Protection
NFPA 16	Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems
NFPA 20	Standard for the Installation of Stationary Fire Pumps for Fire Protection
NFPA 750	Standard on Water Mist Fire Protection Systems
NFPA 2001	Standard on Clean Agent Fire Extinguishing Systems

Instruments

API	Manual of Petroleum Measurement Standards
API 14 C	Analysis, Design installation and Testing of Basic Surface Safety Systems for Offshore
	Production Platform.
API RP 14F	Design and Installation of Electrical System for Offshore Production Platform
API 525	Testing Procedure for Pressure Relieving Devices
	discharging against Variable Back Pressure
API RP 526	Flanged steel safety relief valves
API 527	Seat Tightness of Relief Valves
API 528	Safety relief valves nameplate nomenclature
API RP 551	Process Measurement Instrumentation
API RP 552	Transmission Systems
API RP 554	Process Instrumentation and Control
API STD 670	Non-contacting vibration and axial position monitoring system
ANSI B.1 65	Pipe flanges and flanged fittings



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ANSI B16.104	Control valves seat-leakage
EN 50081	Electro-Magnetic Compatibility - Generic Emission Standard - Pt. 2 Industrial
	Environment
EN 50082	Electro-Magnetic Compatibility – Generic Immunity Standard - Pt. 2 Industrial
	Environments
HS	Offshore Installations – Prevention of Fire and Explosion and Emergency Response
HSE	Offshore Installations - Guidance on Design, Construction and Certification 4th edition
	1990
IEEE 802.4	Token bus network
IEC 60354-4-43	Electrical installation of building protection for safety.
	Protection against over current.
IEC 600 534	Industrial process control valves
IEC 60654	Operating conditions for industrial process measurement and control equipment.
IEC 60 584	Thermo couples
IEC 60 751	Industrial platinum resistance thermometer sensors
IEC 60 1131	Logic operation languages
IEC 61508	Functional Safety: Safety Related Systems
IEC 60363	
IEC 60535-2	
ISA	Standards and Recommended Practices for Instrumentation and Controls
ISA 5.1 to ISA 5.5	Instrumentation Symbols and Identification
ISA-S 18.1	Annunciate sequences and specifications
ISA-RP 7.1	Pneumatic control circuit pressure test.
ISA-S71.04	Environmental conditions for process measurement and control systems: Airborne
	contaminants
ISA-S75.1	Flow equation for sizing control valves
ISA-S 84.01	Application of safety instrumentation system for the
	process industries
ISO 1000	SI units and recommendation for use of their multiples and of certain other units.
ISO 5167	Measurement of Fluid Flow by means of Orifice Plates, Nozzles and Venturi Tubes
	inserted in Circular Cross Section Conduits Running Full
ISO 5168	Measurement of Fluid Flow - Estimation of uncertainty of a flow-rate measurement
ISO 10303	Plant data interchange
NAS 1638	Cleanliness requirements of parts used in hydraulic
	systems
NFPA	National fire protection association
SOLAS	Safety of live at sea
IMO	International Maritime and Organisation
IEC 1508	Functional safety of safety related systems
DIN V 19250	Fundamental safety aspects to be considered for measurement and control equipment
Telecommunication	Refer to Design Basis Telecommunication SNID-SD-J-0003

Electrical

IEC 60034	Rotating electrical machines.
IEC 60038	IEC standard voltages.
IEC 60044	Instrument transformers
IEC 60050	International electro-technical vocabulary.
IEC 60051	Direct acting indicating analogue electrical measuring instruments and their
	accessories.
IEC 60056	High-voltage alternating-current circuit-breakers.
IEC 60059	IEC standard current ratings.
IEC 60060	High-voltage test techniques.



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IEC 60068 Environmental testing. IEC 60071 Insulation co-ordination. IEC 60072 Dimensions and output series for rotating electrical machines. IEC 60076 Power transformers. IEC 60079 Electrical apparatus for explosive gas atmospheres IEC 60079-0 Part 0 : General requirements Part 1 : Construction and verification test of flameproof enclosures of electrical IEC 60079-1 apparatus IEC 60079-2 Part 2 : Electrical apparatus, type of protection 'p' IEC 60079-3 Part 3 : Spark test apparatus for intrinsically-safe circuits IEC 60079-4 Part 4 : Method of test for ignition temperature IEC 60079-6 Part 6 : Oil-immersion 'o' IEC 60079-7 Part 7 : Increased safety 'e' Part 11 : Intrinsic safety 'i' IEC 60079-11 IEC 60079-12 Part 12 : Classification of mixtures of gases of vapours with air according to their maximum experimental safe gaps and minimum igniting currents. IEC 60079-13 Part 13 : Construction and use of rooms or buildings protected by pressurisation IEC 60079-14 Part 14 : Electrical installation in hazardous areas (other than mines) IEC 60079-15 Part 15 : Electrical apparatus with type of protection 'n' Part 17 : Inspection and maintenance of electrical installations in hazardous areas (other IEC 60079-17 than mines). IEC 60079-18 Part 18 : Encapsulation 'm' IEC 60079-19 Part 19 : Repair and overhaul for apparatus used in explosive atmospheres (other than mines or explosives) IEC 60079-20 Part 20 : Data for flammable gases and vapours relating to the use of electrical apparatus. IEC 60083 Plugs and socket-outlets for domestic and similar general use standardised in member countries of IEC. IEC 60085 Thermal evaluation and classification of electrical insulation. IEC 60095 Lead-acid starter batteries IEC 60099 Surge arrestors IEC 60112 Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions IEC 60129 Alternating current disconnectors and earthing switches IEC 60137 Insulating bushings for alternating voltages above 1000 V. IEC 60146 General requirements and line commutated converters. (Semiconductor convertors) IEC 60152 Identification by hour numbers of the phase conductors of 3-phase electric systems IEC 60156 Insulating liquids-Determination of the breakdown voltage at power frequency - Test method. Low-voltage control gear. IEC 60158 Guide to the selection of high-voltage cables. IEC 60183 IEC 60186 Voltage transformers. IEC 60196 IEC standard frequencies. IEC 60204 Electrical equipment of industrial machines. IEC 60214 On-load tap-changers. IEC 60228 Conductors of insulated cables. IEC 60230 Impulse tests on cables and their accessories. IEC 60255 Electrical relays. (All-or-nothing electrical relays) IEC 60265 High-voltage switches. IEC 60269 Low-voltage fuses. IEC 60282 High-voltage fuses. IEC 60287 Electric cables - Calculation of the current rating. IEC 60289 Reactors. IEC 60298 A.C. metal-enclosed switchgear and control gear for rated voltages above 1 kV and up



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	to and including 52 kV
IEC 60304	Standard colours for insulation for low-frequency cables and wires.
IEC 60331	Fire-resisting characteristics of electrical cables
IEC 60332	Tests on electric cables under fire conditions
IEC 60354	Loading guide for oil-immersed power transformers
IEC 60364	Electrical installations of buildings
IEC 60420	High-voltage alternating current switch-fuse combinations
IEC 60439	I ow-voltage switchgear and control gear assemblies
IEC 60445	Identification of equipment terminals and of terminations of certain designated
ILC 00445	conductors including general rules for an alphanumeric system
IEC 60446	Identification of conductors by colours or numerals
IEC 60440	Voltage bands for electrical installations in buildings
IEC 60466	A C insulation-enclosed switchgear and control gear for rated voltages above 1 kV and
ILC 00400	up to and including 38 kV
IEC 60478	Stabilised nower supplies d.c. output
IEC 60502	Dower applies with avtruded insulation and their accessories for roted voltages from 1
IEC 00502	Fower capies with extruded insulation and then accessories for fated voltages from f kV $(\lim_{n \to \infty} -1.2 \text{ kV})$ up to 20 kV $(\lim_{n \to \infty} -26 \text{ kV})$
IEC 60520	KV (OIII – 1.2 KV) up to 50 KV (OIII – 50 KV).
IEC 60529	Application guide for an load ten abangers
IEC 60542	Application guide for on-load tap changels
IEC 00349	High-voltage fuses for the external protection of shuft power capacitors
IEC/IR 60616	Creating and tapping markings for power transformers
IEC 60617	Graphical symbols for diagrams
IEC 60621	Electrical installations for outdoor sites under neavy conditions (including open-cast
IEC 60622	mines and quartes). Montod michal as deriver anismatic machanaschla single selle
IEC 60622	Venteu nickei-caunnum prisinatic rechargeable single cens
IEC 60644	Fight-voltage motor statters
IEC 60644	Specification for high-voltage fuse-links used with motor circuit applications
IEC 60696	Insulation co-ordination for equipment within low-voltage systems
IEC 60686	Stabilised power supplies, a.c. output
IEC 60721	Classification of environmental conditions
IEC 60721	Cuide to the lightning impulse and suitable circulate testing of neuron repreferences and
IEC 00/22	Guide to the lightning impulse and switching impulse testing of power fails formers and
IEC 60724	Cuide to the short circuit temperature limits of electric cables with a rated voltage not
IEC 00724	exceeding 0.6/1.0 kV
IEC 60726	Dry type power transformers
IEC 60720	Divelype power italistorials Isolating transformers and safety isolating transformers. Requirements
IEC 60742	Somioonductor devices Machanical and alimatic test methods
IEC 60749	Test on gases evolved during combustion of metarials from cohles
IEC 00754 IEC/TP 60755	Conoral requirements for residual current operated protective devices
IEC/1K 00/33	Code for designation of colours
IEC 60781	Application guide for colours
IEC 60787	Application guide for the calculation of fuer links of high voltage fuer for transformer
IEC 00/8/	Application guide for the selection of fuse-links of high-voltage fuses for transformer
IEC 60800	Uncult application.
IEC 60800	of ico formation
IEC 60801	01 ICE 101111811011. Electromagnetic compatibility for inductrial process measurement and control
IEC 60801	environment and comparison of industrial-process measurement and control
	equipment.
IEC 60811	Common test methods for insulating and sheathing materials of electric cables
IEC 60812	Analysis techniques for system reliability - Procedure for failure mode and effects
120 00012	analysis (FMEA)
IEC 60814	Guide for the selection of insulators in respect of polluted conditions
IEC 60836	Specification for silicone liquids for electrical purposes
	Specification for sincone riquids for electrical parposes



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IEC 60839 Alarm systems. IEC 60853 Calculation of the cyclic and emergency current rating of cables IEC 60865 Short-circuit currents - Calculation of effects IEC 60867 Insulating liquids - Specifications for unused liquids based on synthetic aromatic hydrocarbons. Electrical test methods for electric cables. Protection against indirect contact by IEC 60885 automatic disconnection of supply Electrical installation guide - Part 704: Construction and demolition site installations. IEC/TR3 61200 IEC 61310 Safety of machinery - Indication, marking and actuation IEC 61312 Protection against lightning electromagnetic impulse IEC 61378 Convertor transformers Heating cables for industrial applications IEC/TR2 61423 IEC/TR2 61430 Secondary cells and batteries - Test methods for checking the performance of devices designed for reducing explosion hazards - Lead-acid starter batteries. Possible safety and health hazards in the use of alkaline secondary cells and batteries -IEC/TR2 61438 Guide to equipment manufacturers and users IEC 61442 Electric cables - Test methods for accessories for power cables with rated voltages from 6 kV (Um = 7.2 kV) up to 30 kV (Um = 36 kV).IEC/TR3 61459 Co-ordination between fuses and contactors/motor-starters - Application guide. IEC 61557 Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. -Equipment for testing, measuring and monitoring of protective measures. IEC 61558 Safety of power transformers, power supply units and similar IEC/TR2 61633 High-voltage alternating current circuit-breakers - Guide for short-circuit and switching test procedures for metal-enclosed and dead tank circuit-breakers. IEC/TR2 61634 High-voltage switchgear and control gear - Use and handling of sulphur hexafluoride (SF6) in high-voltage switchgear and control gear **IEEE 519** Recommended practices and requirements for harmonic control in electrical power systems.

Structural

AISC	Manual For Steel Construction
API RP2A	Recommended Practice for Planning, Design and Construction of Fixed Offshore
	Platforms (20 th WSD)
API RP 2B	Specification for Fabricated Structural Steel Pipe
API RP 2G	Recommended Practice for Production Facilities on Offshore Structures
API RP 2L	Recommended Practice for Planning, Designing, and Construction Heliports for
	fixed Offshore Platforms
API RP 5L	Specification for Line Pipe
API RP2X	Ultrasonic Examination of Offshore Structural Fabrication and Guidelines for
	Qualification of Ultrasonic Technicians
ASME B 18.22.	Plain Washers
ASTM 370	Testing Of Materials
AWS D1.1	Structural Welding Code - Steel
AWS A2.4	Symbols for Welding and NDT
AWS A3.0	Welding Terms and Definitions
BS 4360	Specification for Weldable Structural Steel
BS 7191	Weldable Structural Steels For Fixed Offshore Structures
BS8100parts1&2	Lattice Towers and Masts
BS2853:1957	The Design and Testing of Steel Overhead Runway Beams
CAP 437	Offshore Helicopter Landing Areas: a Guide to Criteria, Recommended Minimum
	Standards and Best Practice
D.En. 1990	Offshore Installations: Guidance on Design, Construction and Certification
DnV	Rules for Classification of Fixed Offshore Installations



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DnV	Buckling Strength Analysis Classification
DnV RP B401	Recommended Practice, Cathodic Protection Design
EEMUA 158	Construction specification for fixed offshore structures in the North Sea
ISO 898	Mechanical Properties of Fasteners
ISO 3506	Corrosion-Resistant Stainless Steel Fasteners - Specifications
ISO 7090	Plain washers, chamfered - normal series -Project Grade A

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1 - General

The terminology used to define the terms and conditions of this section shall the same meaning as the definitions clarified in ISO 9000 Series. The Contractor to familiarize itself with these terms and conditions and ensure the same translations are understood at all levels of the CONTRACTOR's project organization and are included in the quality documents developed for usage in the performance of the WORK.

2 - Quality Management System

The CONTRACTOR shall establish, implement and maintain an effective, documented Quality Management System that covers all activities related to individual elements of the WORK. The Quality System shall comply with the requirements of BS EN ISO 9001:1994 "Quality Systems, Model for Quality Assurance in design, development, production, installation and servicing". Document records shall be kept by the CONTRACTOR to verify that the system is being effectively implemented and maintained by the CONTRACTOR and by its SUBCONTRACTORS and suppliers.

3 - QA/QC Management

The CONTRACTOR shall nominate a qualified, competent and experienced QA/QC Manager and shall ensure that the QA/QC Manager has the organizational freedom to ensure that the Quality Management System is being fully implemented during all phases of the performance of the WORK. The CONTRACTOR shall ensure that sufficient quality control personnel, qualified to perform the activities associated therewith, are provided to assist the QA/QC Manager and to regulate inspection and testing activities.

The CONTRCATOR's organization chart should be included the quality assurance and quality control structure.

4 - Quality Assurance Plan

The CONTRACTOR shall develop a project specific Quality Assurance Plan for the performance of the WORK that defines clearly the Quality Management System and the CONTRACTOR's organizational structure to be applied to the various stages of such performance. The Quality Assurance Plan shall set out the quality practices, resources and the sequence of major activities to be performed ands shall include the following as a minimum:

- Signed Policy Statement;
- Clearly defined project objectives and achievement targets for the quality standards;
- An updated listing of corporate and project specific procedures;



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- An Activity Matrix clarifying primary and secondary responsibilities;
- An internal / external Audit schedule
- Organization charts showing reporting / communication lines and interfaces to SUBCONTRACTORS and Suppliers

The Quality Assurance Plan shall not make excessive references to corporate management manuals or procedures.

5 - Quality Control

5.1 - General

The CONTRACTOR shall ensure that the design-output meets the design-input requirements, in connection with which the CONTRACTOR shall only use competently, qualified quality control personnel certified to a recognized standard for performing and recording inspection activities.

The Quality Control department shall act as an independent group from the production department and shall have a direct reporting relationship with the QA Manager. It will be the responsibility of the QC Manager to ensure the required amount of inspection, both visual and NDT, is correctly identified in a weld history sheet and carried out in an expedient manner. Any MATERIAL or EQUIPMENT provided by the CONTRACTOR, or workmanship or final inspections performed that do not conform to the specified requirements shall be correctly reported by the CONTRACTOR using agreed formats.

The Quality Control Department shall be responsible for ensuring that only qualified personnel are used for the performance of welding and NDT activities. The CONTRACTOR shall compile a listing of same detailing the name of the individuals, the level of proficiency (for NDT personnel), the Weld Procedure Specification and the dates qualified. This listing shall be maintained and approved by the QC Manager. Copies of the qualification certificates shall also be kept in the QC department.

The QC department shall maintain an up to date register detailing the EQUIPMENT used, including welding and NDT sets. Such register shall detail clearly the serial numbers and the date each piece of EQUIPMENT was calibrated. Copies of the calibration certificates shall be maintained with the EQUIPMENT.

5.2 - Quality Control Plan

The CONTRACTOR shall develop a Contract Quality Control Plan for each phase of the performance of the WORK. The Contract Quality Control Plan shall include the following as a minimum and make provision for CONTRACTOR, CLIENT and other Third Party inspection and test codes:

- Activity Number;
- Activity description;



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- Referenced procedure work will be performed against;
- Acceptance criteria;
- Party responsible for performing the inspection;
- Inspection codes against each activity;
- Verifying records.

The Quality Control Plan shall include a definition of the various inspection codes the CONTRACTOR has elected to use.

6 - Criticality Assessment

- 6.1 Prior to the start of each major structural fabrication exercise, nominated representatives of the CONTRACTOR's engineering group, construction and QC Department, accompanied by others as necessary, shall perform a critical assessment of the design, to establish the best methodology for building, erecting and inspecting the assemblies.
- 6.2 The results of these assessments shall be documented and issued to the CLIENT REPRESENTATIVE for review and comment. Once agreed, a list of the components and activities considered critical to the safe performance and reliability of the finished structures shall be issued by the CONTRACTOR detailing the extent of any additional inspections that may be required, which are not clearly specified in the Inspection Test and Plans.

7 - QA/QC Reporting

- 7.1 The CONTRACTOR shall provide QA/QC reports and shall include same in the reports to CLIENT as described in Section V-ADMINISTRATION INSTRUCTIONS, the Article headed REPORTING.
- 7.2 The weekly report shall provide a brief account of any major activities achieved and will include items such as but not necessarily limited to:
 - Status of QA/QC deliverables
 - Results of audits performed
 - Weld procedure status
 - Welder qualification program
 - Weekly look ahead
 - Areas of concern
- 7.3 The monthly report shall provide a detailed account of activities achieved and will include items such as but not necessarily limited to:
 - Detailed account of planned and achieved activities
 - Number of welds to be inspected, number of welds inspected



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- Repair rates
- Number of hydro tests to be performed number completed
- Non conformances raised and closed
- Concessions and or waivers requested
- Monthly look ahead
- Areas of concern

8 - Document Procedures

The CONTRACTOR shall prepare project specific procedures, plans, manuals and the like that are required to ensure that the QA/QC activities are carried out in an efficient and professional manner. The CONTRACTOR shall ensure that its SUBCONTRACTORS, vendors and suppliers develop similar documents. The numbering system used for these documents shall comply with the "CONTRACTOR'S Document Numbering System".

9 - Subcontractor / Vendor Control

The CONTRACTOR shall ensure that any elements of the WORK that are performed by SUBCONTRACTORS or the manufacturers of any items purchased by the CONTRACTOR are manufactured and inspected to the highest achievable standard. The CONTRACTOR shall develop inspection surveillance plans detailing the type of components being manufactured by its SUBCONTRACTORS and suppliers, the criticality of such components and the frequency of the inspection of same. The CONTRACTOR shall not rely solely on the inspections performed by the SUBCONTRACTORS and suppliers and periodically the CONTRACTOR shall perform inspections of subcontracted and supplied components at the place of the manufacture of same.

10 - Audit by Contractor

The CONTRACTOR shall prepare and submit as part of the Contract Quality Assurance Plan an internal/external audit schedule in respect of its own audit activities.

11 - Quality Records

The CONTRACTOR shall maintain and shall make available to CLIENT, in the form of Manufactures Record Books (MRB's) and "As-Built" drawings, records that provide objective evidence that the WORK as performed complies with specified requirements. Details of the contents of the MRB's, the records maintained and retention periods thereof shall be described within documents listed in the Contractor's Quality Assurance Plan.



12 - Non-Conformance

The CONTRACTOR shall implement a formal system for handling and controlling any deficiencies that deviate from a specified standard. The CONTRACTOR shall ensure that all non-conformances are correctly reported to the relevant party responsible for correcting the deficiency. A register of non-conformances shall be maintained by the QA Manager who shall be responsible for checking the status of the corrective actions to be carried out by the CONTRACTOR.

13 - Access for Client

An element of the representation of CLIENT at the construction WORKSITE, shall be present for the purpose of reviewing documents, welding parameter checks, NDT and coating practices and for the review of the performance of any other activities that CLIENT feels may affect the quality of the finished product. The representative of CLIENT shall be granted free access to all quality records of the CONTRACTOR including audit reports and any other documentation generated for the purpose of maintaining quality.

14 - Lessons Learnt

The CONTRACTOR shall develop a system for identifying and recording occurrences that may or may not have resulted in a non-conformance but that could have had detrimental effects on the integrity of the finished product had it not been identified and corrected in time. Such system shall record the each of such occurrences stating the nature of same, its root cause, what action was taken to rectify the problem and what the consequences would have been had the subject occurrence been ignored.





<u>1 - General</u>

The CONTRACTOR shall provide accurate reports as to the progress of the WORK and the cost/schedule information required in accordance with this Article, including but not being necessarily limited to, the highlighting of all trends that may impact upon the CONTRACT PRICE, the CLIENT PLAN and/or PROGRAMME. The reports shall include explanations of any deviations from the CLIENT PLAN and where required, proposals for remedial action accompanied by revised plans, schedules and projections that may be required by CLIENT.

2 - Weekly Reports

Throughout the duration of the CONTRACT the CONTRACTOR shall provide a Weekly Report, electronically, to CLIENT.

The Weekly Report shall include but not be necessarily limited to :

- Highlights of significant accomplishments made during the report period including the achievement of the completion of any MILESTONES;
- A short narrative section inclusive of a summary of the status of the WORK and the progress achieved throughout the week and explanations concerning any deviations from the PROGRAMME;
- Areas of concern including delays and anticipated delays and details of any slippages and corrective actions taken by the CONTRACTOR. Such areas of concern should include reference to any items to be provided by CLIENT, if appropriate.
- Quality assurance and quality control reports
- Every other week, the report will also include details concerning the following items;
- The percentage of the WORK complete by phase, MILESTONE and overall compared with the completion planned for same at that date;
- The number of CONTRACTOR PERSONNEL, by discipline, mobilised to the WORK;
- List of data and decisions outstanding from CLIENT;
- Actions for next week;
- Safety record inclusive of lost time incidents, explanation and actions taken or actions proposed to be taken;

3 - Monthly Reports

Throughout the duration of the CONTRACT the CONTRACTOR shall provide a monthly report the cut-off point for monthly reports shall be the last day in a calendar



month. Where possible the report should also be issued to CLIENT in an electronic format.

The monthly report shall include but not be necessarily limited to :

a) A narrative section providing details of the following :

- Highlights of significant accomplishments during the report period;
- Details of the progress achieved in relation to the MILESTONES and Key Dates in the CLIENT PLAN, including the nature and an explanation of any deviations from such MILESTONES and Key Dates, the consequences of such deviations and the corrective actions taken;
- Details of any trends, critical activities and slippages;
- Highlights of significant events that are anticipated to be completed in the month subsequent to the month under review (a four weeks look-ahead);
- Areas of concern that are affecting or which may affect the performance of the WORK;
- Brief details of all outstanding CONTRACTOR/CLIENT actions and decisions implemented or proposed to manage identified areas of concern;
- Safety record inclusive of lost time incidents, explanation and actions taken or proposed be taken and the information required in accordance with the Article headed ACCIDENT AND INCIDENT REPORTING;
- A summary of the implementation of quality assurance identifying audits and reviews performed, corrective action requests raised, actioned and "closed-out", non-conformance and other quality control reports as described in

Section 8QUALITY ASSURANCE, the Article headed QA/QC REPORTING.

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Definition of Terms

Accident

An unplanned or undesired event that can result in harm to people, property or the environment.

Exposure

The measurement of time during which the subject is at risk from a hazard.

FAT

Factory Acceptance Testing

Fatality

Death due to a work related incident or illness regardless of the time between injury or illness and death.

Harm

Includes death, injury, physical or mental ill health, damage to property, loss of production, or any combination of these.

Hazard

A source or a situation with a potential to cause harm, including human injury or ill health, damage to property, damage to the environment, or a combination of these.

Housekeeping

Maintaining the working environment in a tidy manner.

HSE

Health, Safety and Environment.

Incident

An event that:

- Results in death or injury to person where the injury requires *medical attention* (including first aid);
- Results in injury/damage to persons, property or process;
- Is not in compliance with statutory requirements, safe work procedures or in house guidelines.

Interface Document

A document that clearly identifies how the Owner's HSE expectations and the Shipyard's HSE management systems will be interlinked during the work programmed.

Lost Time Injury (LTI)

Work related injury or illness that renders the injured person unable to perform any of their duties or return to work on a scheduled work shift, on any day immediately following the day of the accident.

Medical Treatment Case (MTC)

Work related injury or illness requiring more than first aid treatment by a physician, dentist, surgeon or registered medical personnel.

MSDS

Material Safety Data Sheet

Near Miss



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A Near Miss is an event where no contact or exchange of energy occurred and thus did not result in personal injury, asset loss or damage to the environment.

Personal Protective Equipment (PPE)

All equipment and clothing intended to be utilised, which affords protection against one or more risks to health and safety. This includes protection against adverse weather conditions.

Restricted Work Case

Work related injury or illness that renders the injured person unable to perform all normally assigned work functions during a scheduled work shift or being assigned to another job on a temporary or permanent basis on the day following the injury.

Risk

A measure of the likelihood that the harm from a particular hazard will occur, taking into account the possible severity of the harm.

Risk Assessment

The process of analysing the level of risk considering those in danger, and evaluating whether hazards are adequately controlled, taking into account any measures already in place.

Risk Management

The process of identifying hazards, assessing risk, taking action to eliminate or reduce risk, and monitoring and reviewing results.

Training

The process of imparting specific skills and understanding to undertake defined tasks.

Unsafe act or condition

Any act or condition that deviates from a generally recognised safe way or specified method of doing a job and increases the potential for an accident.

SWL

Safe Working Load.

Work Programme

The work being undertaken by a site on behalf of the Company.

Worksite the premises where any building operations or works of engineering construction related to the work program are being carried out.

1 - Scope

This plan covers the requirements of the accident prevention rules and safety program to be applied to the contraction work for various Projects that will be performed by the Construction Sub contractor tractor under the supervision of FANN AZMAYAN POOYANDEH Company. (Hereinafter called Contractor). The primary purpose of this plan is to provide a guideline for preventing any accidents which may injure Employees or damage property of the Owner, Contractor and his Contraction Sub contractor tractors (hereinafter called Subcontractor) at the construction site.



Construction Subcontractors shall abide by all safety rules and other regulations imposed at the site by the Laws of the country and the provisions of applicable laws, rules and regulations, including rules and procedures as applicable from the Owner. (PMC Procedures)

2 - Organization

2.1 - General

The safety requirements stipulated in this plan shall be strictly met and maintained by the safety organization at construction site.

2.2 - Safety Committee

2.2.1 - Contractor shall organize a safety committee consisting of Contractor's Site Manager, Contractor's Safety Manager, the Subcontractor's Field Safety Manager.

- 2.2.2 Safety Committee shall:
 - Monitor and ensure the operation of safety program in a proper manner.
 - Direct, coordinate and orient the safety activities.
 - Promulgate the spread of policy, objectives, rules and/ or regulations.
 - Look for, detect, and identify risky conditions.
 - Perform a thorough investigation of all accidents and review the recommendations to avoid any repetition of the accident.

2.3 - Responsibility

2.3.1 - Contractor's Site Manager

Contractor's Site Manager shall

- Have the prime responsibility for ensuring the site safety.
- Establish a realistic safety policy and safety targets for the site.
- Promote the setting up of safety plan, regulations and rules and of a safety training plan, etc.
- Organize and preside over safety committee.
- Direct the Subcontractor's construction Manager, Field Safety Manager and other managers in carrying out their duties and responsibilities.

2.3.2 - Contractor's Safety Manager shall:

- Chair a weekly safety committee meeting.
- Coordinate the safety activities between the Owner and Construction Subcontractor.
- Review and approve the Construction Subcontractor's safety program and procedures, advise and recommend any corrective actions necessary.
- Conduct periodic safety audits to ensure that the established safety program is implemented in a proper manner for construction work.

2.3.3 - Subcontractor's construction Manager shall:



- Be responsible for all safety activities, including fire prevention during the construction period.
- Organize the safety committee.
- Submit a safety program including safety measures for the work to the Field Safety Manager prior to commencement of the work.
- Establish, implement and maintain the safety program through the Safety Supervisor and Workers.
- Conduct independent audits to assure conformance with the established safety program and determine the effectiveness of individual elements of the program.

2.3.4 - Subcontractor's Field Safety Manager shall:

- Conduct daily safety four report to Contractor.
- Conduct a safety program under the direction of the Construction Manager.
- Patrol the work site periodically to verify that the work is carried out under safe conditions, with no violations of safety requirements.
- Advise promptly the Construction Supervisors and Workers of corrective action when any unsafe conditions or violations are observed.
- Check each work procedure from the safety point of view and advise the Construction Supervisors before commencement of work and, or while working.
- Submit accident report to Contractor Safety Manager and Owner's representative.
- Maintain the published safety literature, safety regulations, codes and other communications in accordance with contract. Advise management of compliance and conditions requiring attention.
- Make thorough analysis of the statistical data through inspection, delineate problem areas, and make recommendations for solutions.
- Check on the use of all types of personal protective equipment, evaluate effectiveness and suggest improvements.

2.3.5 - Subcontractor's Supervisor/ Foreman shall:

- Organize sites so that the work is carried out in accordance with the safety standards required for the minimum risk to employees and property.
- Know the safety requirements stipulated in the safety program.
- Give precise instructions as to the requirements for correct work method.
- Coordinate with his Subcontractors to avoid any confusion about areas of responsibility.
- Make sure that suitable personal protective equipment is available and in use.



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• Ensure that new employees are properly instructed in precautions to be taken before they are allowed to start work.

2.3.6 - Subcontractor's Worker shall:

- Do nothing to endanger himself or coworkers.
- Use the correct tools and equipments for the job.
- Keep tools in good condition.
- Use proper personal safety equipment provided at all times.

3 - Safety Reports / Meetings & Noties

3.1 - Accident Reports

- 3.1.1 All accidents are to be immediately reported orally to the supervisor in the cases described
 - below and will be followed by a written report.
 - All fatal injuries.
 - All injuries requiring first aid treatment.
 - All damages, to the Owner's or Contractor's properties.
 - All fires.
 - All releases or spills of hazardous materials.
- 3.1.2 A written accident report shall describe in detail the circumstance, and include the results of the accident investigation and analysis. This report describes the accident classification, cause, time, date, location, etc. Written incident reports shall be submitted to Safety Manager and Owner's representative through Contractor within 12 hours.
- 3.1.3 A daily first aid record must be kept on all employees requiring first aid treatment.

3.2 - Safety Committee Meeting

- 3.2.1 A safety committee meeting shall be held on a weekly basis and chaired by the Contractor's Safety Manager and attended by all Safety Committee members.
- 3.2.2 All Safety Committee members prior to holding a meeting shall conduct a joint site safety inspection and the inspection results shall be discussed at the meeting.

3.3 - Notice for Corrective Actions

- 3.3.1 If the Construction Subcontractor fails or refuses to fulfill his safety responsibility or to correct unsafe conditions or practices, he will be ordered by Contractor to take the necessary corrective action.
- 3.3.2 When any negligence of safety and/ or unsafe practices are detected, Contractor shall immediately advice and or instruct the Construction Subcontractor to correct them.
- 3.3.3 If the Construction Subcontractor fails to heed the instruction or advice or neglects fire precautions described in the work permit, Contractor shall issue the letter of instruction



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for corrective action to the Construction Subcontractor. The unsafe work will be stopped. The work will not commence again until corrective action has been taken.

- 3.3.4 Daily safety inspections
- Daily safety tour shall be made by Subcontractor's Field Safety Manager who will record and submit 1 copy of the daily safety check list to the Contractor's safety Manager.

4 - Safety Orientation & Education

- 4.1 It is mandatory for each employee to attend the Safety Orientation program on his first day of work. No worker will be permitted to work on the site without attending the Safety Orientation Program and attached safety requirements.
- **4.2** The orientation will be given by the Subcontractor's Field Safety Manager and must include followings:
 - Brief explanation of the program.
 - Safety/ Security control policy.
 - Outlines of applicable regulations and requirements for the project.
 - Emergency procedures.
 - First aid services.
 - Each worker's responsibilities.
- **4.3** Biweekly Monday morning (2 times per month) before start of work a safety education is held by the Subcontractor's Field Manager for all workers and staffs and the record of safety education shall be kept and maintained by the Subcontractor.
- **4.4** Every morning before start of work a safety talk session is held by the Supervisor with the foremen of each work place to instruct and discuss:
 - Work procedures.
 - Safety instructions for using equipment and tools.
 - Particular hazardous conditions and precautions to be taken.
 - Workmen's health conditions and other required information.
- 4.5 A written record will be maintained on all employees stating that they have received the safety training and fully understand the rules and regulations. This form will be signed and dated by each employee and kept on file in the Subcontractor's safety Department for auditing and other relevant purposes.
- **4.6** Periodic updating of the safety training procedure and requirements is provided for supervisors and foremen every two or three month.

5 - General Plant Regulations

5.1 - Employee Requirements

All employees must be in good physical condition, i.e. appear healthy, have adequate hearing and sight, possess all limbs, do not suffer form vertigo, etc.



5.2 - Vehicles and Equipment

- 5.2.1 Employees will comply with all safety rules and signs regarding traffic and vehicle use. Vehicles must be parked only in areas approved by Contractor. If these areas include factory roadways, vehicles must only park on the sidewalk that traffic signs allow parking. Without such traffic signs, parking is prohibited. This is to permit access of emergency vehicles at all times.
- 5.2.2 Speed limit within the site is controlled according to site and road condition, but must not exceed maximum 35 Km/hr.
- 5.2.3 All equipment, machinery and tools for use on the job site must be approved by Contractor, and shall be subject to initial and periodic inspection by Contractor, Any equipment, machinery and tools, which have not been approved, must be removed from the site.
- 5.2.4 The engines of all vehicles and equipment should be stopped during refueling.

5.3 - Alcohol and/ or Controlled Drugs

- 5.3.1 Alcoholic drinks and / or Controlled Drugs are not to be used or allowed on the site at any time.
- 5.3.2 Anyone found under the influence of, or in possession of, alcohol or Drugs will be immediately removed from the site and refused future access.

5.4 - Smoking

- 5.4.1 Smoking is not permitted except in specified areas of workshops and buildings, temporary buildings used may be Contractorlared smoking areas under special permits. Smoking in vehicles on the site is not permitted.
- 5.4.2 Smoking is not permitted in any building under construction.
- 5.4.3 Smoking is not allowed in the plant except certain designated area.
- 5.4.4 Matches and lighters are not allowed in the plant. Cigarette butts should be discarded only in proper receptacles.

5.5 - Safety Signs

- 5.5.1 Contractor's Subcontractors and all personnel shall observe the requirements of all safety signs on site.
- 5.5.2 Contractor, Subcontractors and all personnel will not remove any safety chain Barrier, tag, marking or sign unless so directed by the proper authority.

5.6 - Holographic Equipment and Radios

- 5.6.1 Holographic equipment (camera, video, etc.) are not permitted on the site without prior approval in writing from Owner.
- 5.6.2 The use of transistor radios, two- way radios, mobile telephones and pack link system inside the plant is not permitted until approved by Contractor and Owner.

5.7 - Time Keeping



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5.7.1 - When Subcontractor wishes to work before or after regular hours, weekends and or Public Holidays, he must have authorization from Contractor.

5.8 - Environmental Control

- 5.8.1 The Construction Subcontractor is responsible for the environmental control specified for the job site including all equipment and machines used.
- 5.8.2 Do not dispose of any used oil or liquid waste direct to the ground, pit or storm drain. Dispose of these materials only in properly labeled containers.

6 - Personal Safety Equipment

6.1 - General

- 6.1.1 Each Construction Subcontractor is totally responsible for providing personal protective equipment for the protection of their employees as needs or requested. It is also the Construction Subcontractor's responsibility to ensure that his employees are well trained and use properly the personal safety equipment at all time in the Site and out of site while working.
- 6.1.2 All tools and equipment are required to be maintained in good working condition. The Safety Supervisor shall inspects all tools and equipment periodically.

6.2 - Head Protection

- 6.2.1 Safety hats or helmets are rigid headgear made of various materials and designed to protect the heat from impact, flying particles, electric shock, or any combination of the three. Each helmet has two parts, a shell and a suspension cradle.
- 6.2.2 Any modification of the safety helmet, especially punching holes in shell, is prohibited.

6.3 - Eye and Face Protection

- 6.3.1 Protection of the eyes and face from physical or chemical agents are of prime importance in an industrial environment. And also, due to intensive sun exposure, uncontrolled dust and high humidity, locally used cotton Scarf should be issued to open area workers during construction period.
- 6.3.2 To select the type of protection will depend on the properties of possibly imposed hazard, but it should be borne in mind that all eye protection and most face protection devices must be considered as optical instruments. They must be selected, fitted, and used with regard to both the type of hazard and the optical condition of the user.
- 6.3.3 Industrial grade safety glasses (with shield) required at all times during working hours in shop or in construction site.
 - 1) Welding and cutting
 - 2) Excavation
 - 3) Driving nails
 - 4) Grinding



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5) Drilling

6.4 - Hand Protection

- 6.4.1 The kind of gloves used depends primarily upon the material or equipment being handled.
- 6.4.2 Gloves should not be used near rotating machinery as they can be caught and trap the hand.
- 6.4.3 Suitable gloves should be worn on most construction work.

6.5 - Food Protection

- 6.5.1 The safety shoe or boot is fitted with a metal toecap. The toecap is capable of withstanding both compression and impact oads.
- 6.5.2 Safety footwear for construction work must be able to withstand a compressive load of 1,100 kg and an impact load of 33 kg.
- 6.5.3 Foot guards must be worn when using jack hammers, tampers and similar equipment.
- 6.6 Safety Belts (or Harness), Lifelines and Lanyards should be worn while working elevation is 3 m high form ground or platform level.
 - 6.6.1 Lifelines, safety belts, and lanyards shall be used only for worker safeguarding. Any lifeline, Safety belt, or lanyard actually subjected to in-service loading, as distinguished from static load testing, shall be immediately removed from service and shall not be used again for worker safeguarding.
 - 6.6.2 Lifelines shall be secured above the point of operation to an anchorage or structural member.
 - 6.6.3 Safety belt lanyard shall be a minimum of 14mm nylon, or equivalent, with a proper length of falling distance no greater than 1.8 m.

6.7 - Safety Nets

- 6.7.1 When workplaces are more than 7.5 meters above the ground or water surface or other surface, and ladders, scaffolds, catch platforms, temporary floors, safety lines or safety belts are not being used, safety nets must be hung with sufficient clearance to prevent contact with the surfaces or structures below.
- 6.7.2 Nets must extend 2.5 meters beyond the edge of the work surface where employees are exposed and must be installed as close under the work surface as practical but in no case more than 7.5 meters below such work surfaces.

6.8 - Respiratory Protection

6.8.1 - Where industrial processes create atmospheric Contaminant, which may be hazardous to the health of employees, the first consideration always should be the application of engineering measures to control release of the contaminants.



- 6.8.2 In some cases, engineering control measures are not practical and the worker should therefore be supplied with personal respiratory protective equipment.
- 6.8.3 Ventilators, fans, air moves, dust mask or a combination of these should be used in dusty atmospheres. Users of dust masks, breathing air masks and respirators must be fit- tested and trained in their use.

7 - Signs, Signals & Barricades

7.1 - Accident Prevention Signs, Tags and Markings

- 7.1.1 When hazardous work is to be performed the appropriate signs and symbols must be posted proir to starting work and must be removed or covered promptly when the hazards no longer exist.
- 7.1.2 Danger signs must be used only where an immediate hazard exists.
- 7.1.3 Caution signs must be used only to warn against potential hazards or to caution against unsafe practices.
- 7.1.4 Accident prevention signs, tags and markings are used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc., until the defective equipment can be repaired or removed.

7.2 - Warning Barricades

- 7.2.1 Warning barricades will be erected before work begins or as soon as specific hazard is identified (in some situations a rigid guardrail will be needed).
- 7.2.2 Warning barricades must be erected and maintained at least two (2) meters from the edge of an excavation or opening.

8 - Fire Protection

- **8.1** All employees must know where fire extinguishers are and how to use them.
- 8.2 Flammables shall be stored in properly labeled contianers.
- **8.3** Accumulation of trash, oily rags, combustible materials and similar fire hazards of any nature will not be permitted.
- **8.4** All welding and cutting torches must be equipped with flame valve and standard operational gauges.
- 8.5 All alleyways, driveways, roads, stairway, ladder and transformers shall be kept clear of hazardous material and equipment.
- 8.6 Refueling of petrol and diesel equipment shall be done only in prescribed areas and with approved equipment. Employees shall take all measures to minimize spills and to clean up immediately and spills which may accidentally occur. Refueling equipment with the engine running is prohibited.
- **8.7** The Construction Subcontractor shall be install and maintain fire extinguisher and fire fighting equipment to be available all times at the construction site and site office.



8.7.1 - There must be a fire extinguisher, water hose or other fire control equipment easily accessible for each welding, cutting, burning or other such operation 8.7.2 During any hot work operation, a pressuized fire hose and 2-piece of 10Ib dry chemical power fire extinguisher must be proveded at place of hot work. All Contractor's personnel shall be properly trained and know how to use such extinguishers and fire hose.

9 - First Aid

- 9.1 Construction Subcontractor shall provide First Aid facilities for his employees on the site.
- **9.2** In the event of accident, all possible efforts to keep on lookers from the scene must be made. The only employees required in such areas are those directly engaged in assisting in the emergency.

9.3 - Shock

- 9.3.1 Any person who has suffered a severe injury or even someone who has narrowly escaped injury is likely to be suffering from shock.
- 9.3.2 It is essential that persons administering first aid be aware of the symptoms of shock and take action to treat these symptoms in addition to the other injuries sustained.

9.4 - Artificial Respiration

- 9.4.1 Electric shock, gassing, drowing, or suffocation may cause breating to stop.
- 9.4.2 Artifical respiration must be started immediately and continued until the patient recovers or unitl professional medical aid takes over. If you are alone, do not leave the patient to seek help until his normal breathing has resumed.

9.5 - Chemicals

- 9.5.1 Actions to be taken in the event of worker accidently cames into physical contract with dangerous chemicals are as follows:
 - If splashed by chemical, goggles should be left in place unit chemicals have been washed off. Unless chemicals have entered the eyes under the goggles, eye protection should be removed only after the chemicals have been washed from the surrounding area.
 - The eyes should be washed with clean water for at least 15 minutes. Chemicals on the skin should be washed off with water using a safety shower where available. When it is necessary to remove clothing, it should be removed while under shower or water spray medical attention is essential in there cases.

9.6 - Head Injuries

- 9.6.1 Action in cases of head injury is to get the patient under medical care without delay.
- 9.6.2 No head injury should be regarded lightly. Every patient who has had even a mild injury to the head is liable to develop complications, which can be serious. Treatment shall be as follows.



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- Loosen all tight clothing around neck, chest, and waist.
- Chech to see if the patient is breathing and initiate artificial respiration, if requird.
- Ensure that his throat and air passages are clear of secretions, foreign bodies, and false teeth.
- Check for other injuries
- Arrange for the patient to be carefully transported to a hospital.

9.7 - Bleeding

- 9.7.1 Every effort should be made to stop bleeding by direct pressure such as by applying a sterilized pad or dressing.
- 9.7.2 The wound should be firmly bandaged. Applying mild pressure on the artery between the wound and the heart may control arterial bleeding.

9.8 - Fractures

- 9.8.1 Where a fracture is suspected, the limb must be immobilized. If possible, the injured part should be eveated to reduce discomfort and swelling.
- 9.8.2 Fracture of the spine or pelvis must be treated with great care.
- 9.8.3 The casualty must not be moved, but should be covered with a blanket and made comfortable. Competent ambulance employee should only remove him.

9.9 - Minor wounds

- 9.9.1 All minor wounds, cuts, and scratches should be attached to immediately, as delay increases the risk of infection.
- 9.9.2 The wound should be cleaned and then covered with a sterilized dressing or adhesive plaster. If the injury become painful, or is inflamed, medical attention should be obtained.

10 - Tools - Hand & Power

- 10.1.1 Any tools or equipment deemed unsafe shall be marked promptly and or repaired or replaced.
- 10.1.2 Each worker must satisfy himself that all tools and equipment to be used by him are in first class condition and appropriate for the job that they are to be used on. Any defect and/or in proper functioning should be repaired to next user and or supervisors.
- 10.1.3 Any tools hand and power shall not be used for pry bars.
- 10.1.4 Tools shall be used only for the purpose for which they are designed.
- 10.1.5 Proper guards or shields must be installed on all power tools.
- 10.1.6 All portable power operated tools are of a certified or approved design and are safe to use.

10.2 - Pneumatic Tools

10.2.1 - Compressed air should not be used to clean the working space.



- 10.2.2 Tools must not be modified or the labels and inscriptions defaced or removed.
- 10.2.3 Competent persons must carry out maintenance of pneumatically operated equipment at regular intervals.

10.3 - Guarding

- 10.3.1 When power operated tools are designed to accommodate guard, they shall be equipped with such guard when in use.
- 10.3.2 Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating or moving parts of equipment must be guarded if such are exposed to contact by employees.
- 10.3.3 Each worker must satisfy himself that all tools and equipment to be used by him are in good condition and appropriate for the job that they are to be used on.
- 10.4 If by using hand and power tools, employees are exposed to the hazard of flying, falling abrasive and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases,, they must be provided with and shall wearthe appropriate personal protective equipment necessary to protect them from the hazard.

11 - Cranes & lifting Equipment

11.1 - General

- 11.1.1 The manufacturer's specifications and limitations applicable to the operation of any and all cranes and derricks shall be complied with.
- 11.1.2 Rated load capacities, recommended operating speeds, special hazard warnings, or instruction must be visible to the operative while he is at his control station.
- 11.1.3 Rigging equipment must be inspected by a competent person and/or operator prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment must be tagged out of service and removed from the work area.
- 11.1.4 A competent person shall make a through, monthly inspection of the hoisting machinery. The operator shall maintain a record of the dates and results of inspections for each hoisting machine and piece of equipment.
- 11.1.5 Standard operating signals should be agreed upon and should be used to direct all operations.
- 11.1.6 No modifications or additions, which affect the capacity of safe operation of the equipment, shall be made without the manufacturer's written approval.
- 11.1.7 Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, must be barricaded to prevent any worker from being struck or crushed by the crane.



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- 11.1.8 Overhead and gantry cranes shall be plainly marked on each side of the crane as to its rated load capacity.
- 11.1.9 Ensure that personnel do not ride on the hook or on a load.
- 11.1.10 Ensure that personnel do not stand, walk or crawl beneath a slung load.
- 11.1.11 Ensure that the hoist rope is vertical to prevent swinging.
- 11.1.12 Avoid twisting or kinking wore rope.
- 11.1.13 Never use nuts and bolts to join a broken chain.
- 11.1.14 Never drop any item of lifting gear from a height.
- 11.1.15 Do not put any strain on ropes which are kinked.

11.2 - Operator

- 11.2.1 The operator must be in possession of a current Government Crane Operator's License. In addition, he must be fully familiar with and competent to operate the particular type of crane to which he is assigned.
- 11.2.2 An operator may be certified to operate more than one type of crane, but under no circumstances is an operator permitted to operate a crane for which he has not been certified.
- 11.2.3 A supervisor must ensure that his operator is physically fit and mentally alert. If the operator shows any signs of illness, he must be removed from the crane.

11.3 - Slinger/Rigger

- 11.3.1 The slinger/rigger is responsible for properly attaching the load to the crane and giving the correct hand signals to the crane operator.
- 11.3.2 He must be properly trained in slinging/rigging, the standard lifting hand signals, and the general capabilities of the crane with which he is working.

12 - Excavation & Trenching

- 12.1 Excavations such as ditches, trenches or holes shall be sloped sufficiently to prevent cave-in or slide. Of sloping is impractical, shoring shall be used whenever the vertical dimension exceed 1.5 meters.
- 12.2 Worker removing shoring after completion of work shall not be in the bottom of the excavation. Shoring shall be removed in a manner to prevent cave-in on worker.
- 12.3 Barricades, handrails, signals or other appropriate warring devices to protect worker from any hazardous operation or xcavation shall be provided. Open trenches, excavations, etc., shall be covered when handrails or barricades do not provide adequate protection.
- 12.4 Grade lines, ropes, chains, and other tripping hazards shall be sufficiently marked to be clearly visible in the day or night.



- 12.5 Excavation by powered equipment is prohibited closer than 1.2 meters to any underground cable. Tiles covering electric cables shall not be removed without prior approval.
- 12.6 Located underground obstacles, cables and piping shall be marked, i.e. physically identified, in the field and will be updated on drawings of underground.
- 12.7 Ground water shall be removed from and kept out of, the bottoms of all trenches and excavations.

13 - Concrete Forms & Shoring

- 13.1 Form work and shoring shall be designed, erected, supported, braced and maintained so that it will safely support all vertical and lateral loads that may be imposed upon it during placement of concrete.
- 13.2 Stripped forms and shoring shall be removed and stockpiled promptly after stripping, in all areas which persons are required to work or pass. Protruding nails, wire ties, and other form accessories not necessary to subsequent work shall be pulled, cut of other means taken to eliminate the hazard.
- **13.3** Imposition of any construction loads in the partially completed structure shall not be permitted unless such loading has been considered in the design and approved by the engineer.

14 - Floor & Wall Opening, & Stairways

14.1 - Floor and Wall Openings

- 14.1.1 All floor, grating or roof openings within a building, or other structure during the course of construction, alterations, or repairing, shall be covered with planks so as to carry safely any load which may be required to be supported thereon, or shall be fenced in on all sides by a standard railing and toeboard.
- 14.1.2 Wall openings, from which there is a drop of more than 1.2 meters, and the bottom of the opening is less than 90 cm above the working surface, must be guarded by standard guardrails. Is the bottom of the wall opening is less than 10 cm above the working surface toeboards must be installed.

14.2 - Guarding of Open-Sided Floor and Platforms

- 14.2.1 Standard guardrails and toeboards must guard every open-sided floor or platform 1.8 meters or more above adjacent floor or ground level.
- 14.2.2 Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units and similar hazards must be guarded with a standard railing and toeboard.

14.3 - Guardrails, Stair, Railings and Toeboards

14.3.1 - A standard railing shall consist of top rail, intermediate rail, toeboard, and posts, and shall have a vertical height of approximately 1 meter from upper surface of top rail shall be



smooth-surfaced throughout the length of the railing. The intermediate rail shall be halfway between the top rail and the floor, platform, runway, or ramp. Minimum requirements for standard railing under various types of construction are as follows:

- For pipe railings, posts and top and intermediate railings shall be a least 1/2inches nominal diameter with posts spaced not more than 2.4 meters on centers.
- For structural steel railings, posts and top and intermediate rails shall be 50 mm by 50mm by 10mm angles or other metal shapes of equivalent bending strength, with posts spaced not more than 2.4 meters on centers

14.3.2 - Stair railing

A stair railing shall be of construction similar to standard railings, but the vertical height shall be not more than 85cm nor less than 75cm from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

14.3.3 - Stairs and Stairways

On all structures, two or more floors (6 meters or over) in height, stairways, ladders, or ramps, shall be provided for employees during construction period. Debris, slippery and other loose materials shall not be allowed on or under stairways. Stairs shall be installed at angles to the horizontal of between 30 and 50. Rise height and tread width shall be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs. Stairways having one or both open sides shall have a stair railing along the open side or sides.

15 - Ladders & Scaffolding

15.1 - Ladders

15.1.1 - All ladders shall be made of the proper material and be in good condition.

- 15.1.2 The use of ladders with broken or missing rungs or steps, broken rails, or other defective construction is prohibited.
- 15.1.3 Metal ladders shall not be used when they can become part of an electrical circuit.
- 15.1.4 All straight ladders shall be tied off.
- 15.1.5 Ladders shall be placed so that they from an angle no greater than 30 degrees from vertical.
- 15.1.6 Ladders shall extend at least 1 meter above the level to be served.
- 15.1.7 Spikes, for use in soft ground.
- 15.1.8 Ensure that footwear is not greasy, muddy or slippery and has a good grip on the rung.
- 15.1.9 Face the ladder and hold on with both hand.
- 15.2 Step ladders


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- 15.2.1 Always open fully, set level on all four feet, and lick spreaders in place. Do not use like a straight ladder.
- 15.2.2 Do not place tools or material on steps or platform.
- 15.2.3 Get specific approval before using two-man stepladders.
- 15.2.4 Must be tied off under certain conditions.

15.3 - Scaffolding

- 15.3.1 Makeshift scaffold, such as boxes, crates, drums and poles are prohibited.
- 15.3.2 Metal tube scaffolding is preferred. Any other scaffold materials require prior approvals.
- 15.3.3 Scaffolding and related material shall be carefully inspected at regular intervals and particularly just before use.
- 15.3.4 Sufficient sills and underpinning shall be provided for all scaffolds erected on filled or otherwise soft ground.
- 15.3.5 Scaffolds shall be plumb and level at all times.
- 15.3.6 Running scaffold shall be anchored to wall approx. every 9 meters of length and 6 meters of height. Additional anchors may be required when using pulley arms.
- 15.3.7 All scaffolding must be equipped with handrails, midriffs and toeboerds regardless of height.
- 15.3.8 Scaffold shall not be used as material hoist towers, for mounting derricks or to support pipe or equipment.
- 15.3.9 Timber boards used in the construction of work platform(s) shall be of good quality and reasonably straight grained, free from injurious ring shakes, cracks, splits, cross grains, unsound knots, knots in Contractorrease the strength of the timber. Planking shall not be painted, as this will conceal defects.
- 15.3.10 Planks used for platforms shall be uniform thickness and laid close together. Planks shall be overlapped at the bearers by at least 0.6 meters, with the bearing in the center of the overlap. When overhang a bears more than one-tenth of the length of the span, the planks shall be securely fastened to the bearer at the opposite end to prevent tipping.
- 15.3.11 Daily inspections shall be performed to ensure that no overstressing of structural members of scaffold will take place. 15.3.12 - Safety belts or harness and lifeline shall be used if other adequate protection against falls cannot be provided during erection or dismantling.
- 15.3.13 Scaffolds and associated equipment shall not be modified in any manner that affects the designed performance. Only heavy tube scaffolding acceptable to heavy construction is allowed.
- 15.3.14 Adjusting screws together with proper blocking shall be used to compensate for unevenness of ground.



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- 15.3.15 Braces shall not be forced to fit. The scaffold shall be adjusted until the proper fit can be made easily.
- 15.3.16 Only ladders shall be used when climbing scaffold; the cross braces shall not be used.

15.4 - Rolling and Tower Scaffolds

- 15.4.1 Tower of a height greater than three times the minimum base dimension shall be used.
- 15.4.2 Caster brakes shall be locked when not in motion.
- 15.4.3 Tower shall be free of men, material and equipment before being moved.
- 15.4.4 Surface over which a tower scaffold is being moved shall be cleaned of rubber or any material that could cause the tower to tip over.
- 15.4.5 Fixed towers shall be guyed or tied-off every 6 meters of elevation.

15.5 - Suspended Scaffolding

- 15.5.1 10mm (minimum) steel wire rope shall be used to support or suspend scaffolds. All suspended scaffolds shall be anchored to prevent swinging.
- 15.5.2 The suspended support shall be electrically insulated when are welding is to be performed to guard against arcing and subsequent failure.
- 15.5.3 Worker on suspended scaffolds work platforms must use independent safely lines and safety harness with lifeline and lanyards.

16 - Steel Erection

16.1 - Personal Protection

- 16.1.1 In all structures, all employees exposed to hazard more than 3m high shall wear safety belt or harnesses. Lifelines shall install as needed to due to facilities tying-off. When the use of safety belt is not appropriate due to the hazard of being pinched or struck by incoming steel, connectors will be only permitted to unhook their safety harness during the actual receiving and positioning of structural members. As soon as it is safe and appropriate to do so (generally as soon as the connection bolts have been installed), the connector will be required to rehook his safety belt.
- 16.1.2 Safety nets are only an acceptable substitute for safety belt when the use of safety belts is impractical. When safety nets are used, they will generally be used on the interior of the structure only. Lifeline will be installed along the perimeter and within the structure whenever employees are exposed will be tie-off whenever they are so exposed.
- 16.1.3 For the protection of other crafts, signs and barricades will be installed at the area where the erection of steel is in progress.
- 16.1.4 It should be emphasized that this mandatory and must be followed at all times. Any person who is found violating this procedure will be subject to removal from the site.



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16.2 - Rigging

- 16.2.1 A competent worker prior to initial use on the project shall inspect rigging equipment and monthly thereafter to ensure that it is safe.
- 16.2.2 Damaged rigging equipment shall be removed from service immediately.
- 16.2.3 Riggers must be qualified to rig and signal.

17 - Welding & Burning

- 17.1 Welding or cutting torches and horsed shall not be connected to cylinders when stored in any enclosure or building. When work is shut down and hoses disconnected all valves at the gas and oxygen cylinders must be closed.
- 17.2 Gas and oxygen cylinders shall be handled with care, properly supported in an upright position away from any source of heat or flames and securely tied-off. All cylinders not in use shall have the protective valve cap in place, shall be vertically secured, and be stored outside the work area.
- **17.3** Oxygen cylinders in storage and not I use shall be separated from gas cylinders by a fire retardant partition or a minimum distance of 6 meters.
- 17.4 When hoisting equipment, a basket lifts gas and oxygen cylinders, cradle or similar handling device shall be closed.
- 17.5 When oxygen or gas cylinders are transported, protective valve caps shall be in place and valves shall be used.
- 17.6 Special care (use of welding blankets) shall be taken during overhead cutting and welding operations to safeguard the work and prevent failing sparks from starting a fire or causing damage. Warning signs shall e posted around and at each level below the area of overhead welding or burning operation. Fire extinguishers will be ready and available, or the plant approved fire houses must be attached to firewater hydrants ready for use.
- 17.7 Gas and oxygen cylinders shall be used when secured on a cylinder carrier. Loose cylinders shall never be used.
- 17.8 Oxygen cylinders and equipment shall be kept free from oil or grease.
- 17.9 Gas and oxygen cylinders shall not be taken into confined spaces.
- 17.10 Welding cables and oxygen gas hoses shall be inspected regularly. The hoses shall be fitted by means of tight hose clamps.
- 17.11 The ground cable shall be attached as close as possible to the work piece by means of a clamp. The ground cable shall not be attached to an existing installation or apparatus. Welding of the ground cable is forbidden.
- 17.12 Welder and his helpers must use adequate eye and face protection while welding. Welding shields (curtains) must be used to protect the eyes of nearby workers from flashburn exposure.



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- 17.13 Oxygen and gas cylinders must be transferred to a designated location away from operating units and tank farms after working hours.
- 17.14 When not in use, diesel welding machines, generators, and transformers must be turned off. When in use they must be protected by suitable covers for general protection. Refueling shall be done with machines turned off.
- 17.15 When employees are working with welding and cutting equipment, adequate ventilation has to be furnished.
- 17.16 All combustible material in the vicinity the welding or cutting operation must be removed, or of this is not possible, covered by fire resistant materials.
- 17.17 All welding cables and oxygen hoses shall hanged 1m high steel column wall not to disturb on passage or access.
- 17.18 The work area must be kept clean and wooden, all combustible material must be removed.

17.19 - Welding machines shall be turned off at the end of your shift.

17.20 - Never do electric welding from a metal ladder

17.21 - Gas and oxygen cylinders shall be provided with turn-off wrench during use.

17.22 - Must be check regulator well fitted to cylinder.

- 17.23 Do not use matches or cigarettes to light a torch.
- 17.24 Do not use compressed gas to clean your clothing, blow out cinch anchor holes or otherwise clean your working area.
- 17.25 Gas cylinders shall be handled with care and shall not be dropped.

17.26 - Gas cylinder shall not be misused as rollers, support or for any other similar purpose.

18 - Electrical Work

- 18.1 Qualified and experienced workers shall perform all electrical woks; equipment shall be locked or secured to prevent starting by unauthorized person.
- **18.2** Warning signs or posters, such as DANGER, NO ENTRY, DON'T TOUCH, etc., shall be posted at dangerous places, such as substations, switch boxes, and overhead or underground cable.
- **18.3** Electrical parts to be used shall be in good condition, including cords for connection. The extension and outlets to connect tools have to be polarized.
- **18.4** Transformer Banks or high voltage equipment shall be barricaded with a fence. The entrance shall be locked.
- **18.5** Circuit Breakers shall be provided for all electrical equipment, to prevent worker from being injured be electrical shock.
- 18.6 Temporary switch boxes shall be installed in the space provided with a waterproof roof and door which can be locked. Switch boxes shall be grounded with vinyl-insulated copper wire.
- 18.7 Before welding machines are used, insulation shall be tested and certified to be in safe operating conditions. Automatic antielectric discharge devices shall provided for all welding machines. All exposed terminals shall be covered safely with insulation tape.



18.8 - To prevent a short circuit or electric discharge, special precautions, such as grounding, shall be taken for wiring work where metal scaffolds or steel structures are erected. Grounding shall be secured by connecting the wire to on earth and buried firmly in the ground.

19 - Vessel & Confined Space Environment (V/CS)

- 19.1 A breathable atmosphere can be maintained by either natural draft or forced ventilation. Compressed air must be blown into a V/CS. Air supplied respiratory equipment is required when entering a V/CS when there is any oxygen deficiency (less than 19.5%)
- **19.2** The atmosphere in the V/CS shall be tested to entry and special care must be taken to ensure that all accessible areas of the V/CS are sampled. Periodic tests should also be done during the work.

19.3 - Welding and Burning

- 19.3.1 The possibility of flammable, explosive, or toxic materials being absorbed in the shell material must be considered prior to burning or welding.
- 19.3.2 All surfaces covered with toxic preservatives shall be stripped of all toxic coating for a distance of at least 2 feet from the area of heat application or employees shall be protected by air supplied respirators and, if applicable, protective clothing.
- 19.3.3 Burning shall be done only with the cylinders located outside the V/CS and hose connections shall be checked for leakage prior to tank entry. Remove all hoses from the V/CS at the end of the work, during lunch periods, etc. welding shall be done only with welding machines left outside the V/CS.

20 - Abrasive Blasting

- 20.1 Abrasive are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. Therefore, the concentration of respirable dust in the breathing zone of the abrasive blasting operator or any other workers must be kept below toxic levels. Adequate personal safety equipment should be provided for works.
- **20.2** Aisles and walkways must be kept clear of steel shot or similar abrasive which may create a slipping hazard. Dust from abrasive operation shall not be permitted to accumulate on floors and shall be cleaned up promptly.
- **20.3** Sand or shot blasting areas, when possible, are to be prepared to minimize dust hazards to other Workers. If this is not possible, all trades working in the area to be blasted should be removed from the area before blasting operations are started.
- **20.4** Operators shall be equipped with heavy canvas or leather gloves and aprons or equivalent protection to protect them from the impact of abrasives. Safety shoes shall be worn to protect against foot injury heavy pieces of work are handled.



20.5 - Equipment for protection of the eyes and face shall be supplied to the operator when the respirator design neither does nor provide such protection and to any other Workers working in the vicinity of the abrasive blasting operations.

21 - Pressure Testing

21.1 - General

The purpose of pressure testing is to establish the strength, tightness, and suitability of a line or vessel. It is essential that safe practices are observed during testing since this can be a hazardous procedure. Stresses are high in the item being tested; there is the danger of air pockets with the subsequent risk or explosion; and where flammable fluids are used for testing, there is the ever present danger of fire should a rupture occur.

21.2 - Preparation

21.2.1 - The person in charge of testing should have read test procedure and instruction prepared in site office. All persons who will work on the test must be informed of the hazards and the necessary precautions.

21.3 - General Requirements

- 21.3.1 No one should be allowed near equipment under test when the pressure is near the yield strength or when test pressures of over 35 Kg/cm2 are being applied. The pressure should be lowered by 10% before inspecting for leaks.
- 21.3.2 The rate of pressure increase must not exceed 7 Kg/cm2 per minute.
- 21.3.3 Smoking and other sources of ignition should not be permitted in the immediate area when testing with a flammable liquid.
- 21.3.4 When draining test fluid, the vessel should be vented slowly to avoid excessive vacuum.
- 21.3.5 Oxygen lines lust be flushed of all traces hydrocarbons before introducing oxygen.

22 - Chemical

22.1 - Handling of Chemicals

- 22.1.1 Before handling any chemical it is essential to know it's properties and follow the proper precaution and procedure.
- 22.1.2 All chemical shall be stored in appropriate containers with proper labels.
- 22.1.3 Hazardous chemical must be effectively isolated to avoid contamination. Incompatible materials must not be stored in the same area.
- 22.1.4 All employees must be aware that many of these chemicals are potential fire, explosion hazards and/or health hazards.
- 22.1.5 If you need assistance in establishing the hazard potential of a chemical, always consult your supervisor.

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	Sheet 79 01 94
وصل دهم	
گواهی نامه ها	



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مو کې مسار کلي توف نُورد ايران (عضو گروه TÜV NORD)

تهران، خیابان سهروردی شمالی، خیابان فیروزه، پلاک ۲۲، ساختمان فیروزه، طبقه پنجم، واحد ٤ کدیستی: ۱۵۵۳۸

تلفن: ۱۹, ۱۹, ۱۹, ۸۸۷٤٦۰۱۶ فاکس: ۸۸۷۵۸۲۱۲ audit.office @tuvnordiran.com www. tuvnordiran.com

تاريخ: ٩٣/١٢/٠٦

شماره: ۱۳۲-۱۵/۰۰۸۸۳

بسمه تعالى

گــــواهی

بدين وسيله گواهي مينمايد كه سيستم مديريت كيفيت

شرکت طراحی و مهندسی تراوش جم

Taravosh Jam Design & Engineering Co. ISO 9001:2008 مبتنی بر استاندارد

در دامنه کاربرد

"طراحی واحدهای نفت، گاز، پتروشیمی و تجهیزات مربوطه

از قبیل(مخازن تحت فشار، مبدل های حرارتی و تجهیزات پالایشگاهی) "

مورد ممیزی صدور گواهینامه (Certification Audit) قرار گرفته است.

از نظر تیم ممیزی، سیستم مدیریت کیفیت در **شرکت طراحی و مهندسی تراوش جم، استقرار** کامل یافته و نتیجه ممیزی مثبت میباشد.

شرکت طراحی و مهندسی تراوش جم، به مرکزیت TÜV NORD CERT در شهر Essen آلمان، جهت صدور گواهینامه ISO 9001:2008 توصیه خواهد گردید.

دكتر كامران رضائي

hi/M

مدير عامل و عضو هيأت مديره





Sheet 82 of 94



Joint Venture Co. (P.J.S) (Member of TÜV NORD Group)

Apt.4, 5th floor, Firoozeh Building, #22, Firoozeh St., North Sohravardi St., Tehran, 15538, Iran Tel: +98–21–88746014, 16, 19 Fax: +98–21–88758212 audit.office @tuvnordiran.com www.tuvnordiran.com

Certification of the Quality Management System

Tehran, 25.02.2015 Number: 132-15-00883

The Taravosh Jam Design & Engineering Co. instructed the Certification Body of TÜV NORD CERT to audit their quality management system to check the compliance with the requirements of ISO 9001:2008 in the scope of:

"Design of Oil, Gas & Petrochemical Units and Related Equipments such as Pressure Vessels, Heat Exchangers & Refinery Equipments"

The objective is the award of the related TÜV NORD CERT certificate. The Certification Audit was performed successfully in the company. The audit team has decided unanimously to <u>recommend issuance of the certificate by</u> the head of certification body of TÜV NORD CERT GmbH.

Dr. Kamran REZAIE

Managing Director & Member of Board







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

TÜV NORD Iran

Apt.4, 6th Floor, Firoozeh Building, No. 22, Firoozeh St., North Sohravardi St., Tehran, Iran



Document Name: TARAVOSH JAM **TARAVOSH JAM Presentation** Sheet 85 of 94 45,1,14: 20 مركئت مهندى وتوسعه نفت VY.17. (سامی خاص) شركت فىنت ايران بسمه تعالى جناب آقاي مهندس عباسيان مدیریت محترم بررسی منابع شرکت پشتیبانی ساخت و تهیه کالای نفت تهران باسلام واحترام به استحضار می رساند شرکت طراحی ومهندسی تراوش جم به آدرس خیابان مطهری خیابان میرعماد کوی دہم پلاک (ساختمان عقاب واحد ۵ جهت مشارکت درطرحهای این شرکت درخواست همکاری دارد لطف دستور فرمایید در مورد شرکت مذکور بررسی و نسبت به اعلام نتیجه کتبی به ایس امبور درخصوص قرارداشتن در ویندورلیست وزارت نفت اقدام لازم معمول فرمايند. 41,1,19 طغرحسين زاده سرشكي لأيرتداركات وخدمات كالا تهران : خيابان استاد نجات الهي خيابان شهيد كلانتري – پلاک ۶۱ . تلفن : ۶۰-۸۸۸۹۸۶۵۰ E-Mail : Info@Pedec.net مىندوق پستى دا ۱۵۹۸۸۴۶۵۱۱

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تاريخ: ۲۲۱٬۲۶ م شماره: ۹۲٬۱۰٬۲۲ م پيوست: م مركب يان	ب ^{سمه تعالی} ُشرکت پشتیبانی ساخت وتهیه کالای نفت تهران <i>بررسی منابع</i>
ىكى	جناب آقای حسین زاده سرش
ات کالا – <mark>شرکت مهندسی و توسعه نفت</mark>	مدير محترم تداركات وخدما
شوع :شرکت طراحی و مهندسی تراوش جم	موه
	باسلام،
ماره ۲۲۱۲ مورخ ۲۲/۱/۲۴ ، به استحضار میرساند شرکت طراحــی ماره ۲۲۱۴ مورخ ۲۲/۱/۹۲ ، به استحضار میرساند شرکت طراحــی	احترما" عطف به نامه ش
ورئیست سرفت پستیبانی ساخت و گهیه کلای نفت گهران به تبت دگونه اقدام مقتضه ایفاد مه گردد.	ومهندسی تراوس جم در وند. بسیده است به مراتب جمت ه
با تشکر	
ر جسین عباسیان رییس بررسی منابع	
	· ·
قرنی شمار، ۲۲۹ ـ. صندوق پستی ۱۵۸۱۵/۱۷۷۵ و ۱۵۸۱۵/۳۶٤ تلفن : ۸۲۰۱۹	تهران ــ خيابان سپهبد
تلفن مستقيم: ۸۸۸۰۳۸۰۵ – ، دررنگار : ۸۸۸۰۳۹۷۶	
پست الکترونیکی:	



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تم جامع بررسے منابع



كزارش اقلام نام شیرکت طرّاحی و مهندسی تراوش جیم فايسل fldSourceFileNo 898336 25 شرح اينــدكس رديـف General 130000 ۱ General 418000 ۲ INCINERATORS, INDUSTRIAL 420101 ٣ General 422200 ۴ AUXILIARY PLANT COMPONENTS AND PARTS 429999 ۵ General 433800 ۶ Y General 434900 SEPARATORS, PROCESS PLANT 438025 ٨ طراحي- اجرا- نظـارت و بازرســي پـروژه هـاي مهندســي 439998 ٩

صفحه 1 از 1

VOSH JAM Pres	entation		TARAVOS DESIGN & F
t Name: AVOSH JAM Presentation Short Sho	Sheet 88 of		
علی معلی می از می معلی می از می می می از می می می از می می می می از می	و درخواست ذیل به شماره ۲-2609 مورخ ن محصولات ذکر شده با کد رهگیری ۲۲۲		
شماره: 2609-F تاریخ: 93/03/26 پیوست: دارد	مال <u>ى</u>	بسمه ت ۳ وش جم	تر اونن ج شرکت طراحی و مهندسی تراوش جاسید شرکت طراحی و مهندسی ترا
	ز ساخت داخل	ره ایران د بررسی منابع و پشتیبانی ا	شرکت نفت فلات قا مدیریت محترم واح
	<i>, تأمین کنندگان</i>	موضوع : شناسائہ	
تولید کنندگان و تأمین نت فلات قاره ایران را سولات فوق به صورت سکوی رشادت (صدرا) ۱- Steam 2- Vacuu 3- Trace 4- Incine 5- Heat F 6- Sampl	, در خصوص ارزیابی و بروزرسانی فهرست بت به پیوست ارسال میگردد. بین و ساخت پکیچ در پروژههای شرکت نا (Vacuum Deaerator (میدرا) میباشد. کلیه مح دای تحت خلاء (Vacuum Deaerator) پروژه این خلاء (Vacuum Deaerator) پروژه این خلاء (Vacuum Deaerator) پروژه این خلاء (Vacuum Deaerator) پروژه این خلاء (Vacuum Deaerator) بروژه این میباشد. کلیه مح این میباشد (Vacuum Deaerator 7 این میباشد (Vacuum Deaerator 7 (Vacuum Deaerator 7) (Vacuum Deaeratora	سی منابع شرکت نفت فلات قاره ایران بیه مدارک و سوایق درخواستی آن شرک راحی و مهندسی تراوش جم سابقه تاه به شرکت نفت فلات قاره، ساخت هواز میلترهای آب نرم (Fine Filter) پروژه هوازن رو مدیریت مهندسی در پروژه هوازن مهندسی تراوش جم که به صورت C مهندسی تراوش جم که به صورت C مهندسی تراوش جم که به صورت مهندسی تراوش جم که به مورت مهندسی تراوش جم که به مهندسی تراوش جم که به می تراوش جم تراوش جم که به می تراوش جم تراوش ج	احتراماً ، بیرو آگهی واحد برر کنندگان تجهیزات مورد نیاز، کا لازم به ذکر است شرکت ط دارا میباشد. (شرکت کنترل قدرت) و ساخت (شرکت کنترل قدرت) و ساخت در ضمن انجام مدیریت برو توسط مدیران ارشد این شرکت محصولات شرکت طراحی و محصولات شرکت طراحی و پیشاپیش از همکاری و لطف جنا
کلی عبدی اللی عبدی اللہ اللہ اللہ اللہ اللہ اللہ اللہ اللہ	بیا تیش حمیدعابدین زاک مدیر عا		
ان عقاب، واحد ∆ <u>INFO@TARAVOS</u>	Pag ابان میرعماد، کوی دهم، پلاک ۱/۱ ، ساخته ۸۸۵۴۴ پست الکترونیکی: HJAM.COM	e I of I <u>جم:</u> تهران، خیابان استاد مطهری، خیا ۱، تلفن: ۷- ۸۸۵۴۴۷۰۶ فاکس: ۷۰۳	آدرس شرکت تراوش کدپستی: ۵۸۷۸۳۵۴۱۶

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یل یازدهم	e
حسن سابقه	

AVOSH JAM Presentation	DESIGN & EN
	Sheet 90 of 9
	91, K, KE
شر کت صنعتی مهادین طراحیمهندسی و ساخت	+1d - T. Fr.
تجهیز ات پالایشگامی و نیروگاهی	
هریک،افضاعی هرکت،ایتایی OLMI در سافت. HP & HT Heat Exchangers	
ALFA	
مشارکت در سافت میداوای مشعرای	
Production of Plate - Type Heat - Exchangers	
	كواهي تأليد محسن الجام كار
and a second sec	
د زمينه طراحي پروسيس و	بدینهسیله از همکاری شرکت مفندسی تراهش جم د
ور ریاد اور ای پرر ای رو های مربوط به فازهای ۱۸ –۱۷	Pig Launcher & Receiver برون Instrument
	11 18
	و١١–١١٩١١ بارس جيوني فدرداني مي تردد .
	و١١-١١٩ ١١ پارس جنوبی قدردانی می فردد .
	و۱۹۳۱ و۱۱ پارس جنوبی قدردانی می تردد . امید است این همکاری در پروژه های دیگر ادامه یابد .
	و ۲۱ او ۲۱ پارس جنوبی قدردانی می تردد . امید است این همکاری در پروژه های دیگر ادامه یابد .
	و۱۹–۱۹و۱۱ پارس جنوبی قدردانی می تردد . امید است این همکاری در پروژه های دیگر ادامه یابد .
	و۱۹–۹۹و۱۱ پارس جنوبی قدردایی می تردد . امید است این همکاری در پروژه های دیگر ادامه یابد .
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	و۱۱–۱۱و۱۱ پارس جنوبی قدردایی می تردد . امید است این همکاری در پروژه های دیگر ادامه یابد . با تشکر
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	و۱۱–۱۱ و۱۱ پارس جنوبی قدردایی می تردد. امید است این همکاری در پروژه های دیگر ادامه یابد . با تشکر مدیر عامل
	و۱۱–۱۱ و۱۱ پارس جنوبی قدردایی می تردد. امید است این همکاری در پروژه های دیگر ادامه یابد . با تشکر مدیر عامل
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بلتک ۱۰ و ۱۲ سندرق پستی : ۱۲۴۴۵ - ۱۱	و ۱۱–۱۱ و ۱۱ پارس جنوبی قدردایی می تردد. امید است این همکاری در پروژه های دیگر ادامه یابد. با تشکر مدیر عامل دند مرکزی : تهران . کیلونتر ۴ جاده مغصوص کرچ . خیابان شیشه مینا . بلوار ولی عصر .



			Sheet	91 of
דוניא: או או א		ى ئژاد	کاز شهید هاشم	شركت بالايش
el's	طام وهندي كر	,		باسلام،
سیسیسان شیماره میسیسیسیسیسیسیسیسیسیسیسیسی ، ریال را از تیاریخ ۲۰ <u>۰۰ می</u> و ا	اقربای	م مسی دارد شرکت/ ۲۱۵ کال ۲۱۶ ۲۱۵ زر روس	سيله اعسلا ولي <u>فلانج</u> س	بدينوس موضوعم
عنوان ارزیابی حسن سابقه شرکت مذکور اعلام می گردد.	انجام رسانیده و موارد ذیل به	مانگار برای این مجموعه به ا	به عنوان پي	مدت
	Jus Ere	PII	ارفرمايى:	نام شرکت کا
مسمور (رسیکا رسیکا سیکر است).	ز)	ننده فرم:(صاحب امضا مجا	وادگی تایید ک	نام و نام خانو
سی الزامی است).	مر بر عاما	احب امضا مجاز)	کننده فرم:(ص	سمت تایید ۲
	-	1	نرای کار	۱-کیفیت اج
نا مناسب (٠) 🗆	متوسط (۵۰) 🗖	خوب(۲۵) امتیاز 🕅	ىتياز 🗆	عالی (۱۰۰) اه
		/	در فنی	۲-کفایت کاه
نا مناسب (٠) 🗆	متوسط (۵۰) 🗆	خوب(۷۵) امتیاز 🗹	متياز 🗆	عالی (۱۰۰) اه
	برستی ما (د) ⊐	معنوی کار کنان تحت سرپ · · · · دهنه ا - او⊐	قوق مادی و	۳–رعایت ح
نا مناسب (۰) 🗆	متوسط (۵۰) <u>ا</u> انکار)	حوب(۲۵) امتیاز∟ ارئیس کارگاه رتماینده سما	متیاز 🛯	عالی (۱۰۰) اه ۴- تمان مدد
نا مناسب (۰) 🗆	متوسط (۵۰) 🗆	ریین در ۵۰۰ مدین خوب(۷۵) امتیاز □	متساد کردرد. متساد ک	عالي (١٠٠) اه
	۔ بی پیمان	، با کارفرما در جهت اجرای	زمانی و تعامل	۵– رفتار سا
نا مناسب (٠) 🗆	متوسط (۵۰) 🗖	خوب(۲۵) امتیاز Д	متياز 🗆	عالی (۱۰۰) اہ
	صوب(زمانبندی پروژه)	بیمان و منطبق با برنامه م	ديريت زمان ب	۶- اجرای مد
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يى (قبلى):	👌 نام دستگاه کارفرما	ثر مسى قدر	مناقصه کر	نام
ا صاحب انعضا مجاز دستگاه کار فرمایی ا	 نام و نام خانواد کی مهر و امض 		ر و امضا	*
لت هاري	and .	-		•
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				Sheet	92	of	94
	تاريخ:		ہی نزاد	ش کاز شهید هاشه	شركت پالا		
					باسلام،		
ADRA-IMTI-P	-040-1391	Sign elle	The take a	ا ا			
مارة محمد المراجع بــــــــــــــــــــــــــــــــــــ	میرانومین چیمین س <u>۔</u> دربر کم رور به		م میں دارد سے کا /اد ۱/۱۰ م	م به اعتر الم به ا	karer e		
المنها. تكا تساريخ بسه	ریسال را از تساریخ	مبليغ <i>.۹۵۹.۹. و.ار.</i> 01 و.کم	4. Fine IIII		موضــوع.		
سُرکت مذکور اعلام می گردد.	ىنوان ارزيابى حسن سابقه ن	جام رسانیده و موارد ذیل به ه	مانکار برای این مجموعه به ان	به عنوان پی	مدت		
(تكميل اين بخش الزامي است).	()	راجى ايران (مى	برد منعب	كارفرمايى:د	نام شرکت		
(تكميل ابن بخش الزامي است).	مانه	iolo (5120 (لننده فرم:(صاحب امضا محاز	بانوادگی تابید ک	نام ونام خ		
		. 7 -			1-31-		
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				اجرای کار	۱-کیفیت		
	نا مناسب (۰) 🗖	متوسط (۵۰) 🗆	خوب(۷۵) امتیاز 🖬) امتياز 🛛	عالی (۱۰۰		
				کادر فئی	۲-کفایت		
	ئا مئاسب (٠) 🗆	متوسط (۵۰) 🗆	خوب(۷۵) امتياز 🖾) امتياز 🛛	عالی (۱۰۰		
		ستی .	معنوی کارکنان تحت سرپر	حقوق مادی و	۳–رعایت		
	تا مناسب (•) 🗋	متوسط (۵۰) اـا کار)	خوب(۷۵) امتیاز 🖪 ۱۰ می کا گاه زمان ده ما:) امتياز 🛛	عالی (۱۰۰		
		لین ا	ردیس دارده .نماینده پیمار تب (۸۸۸) مارکا	ندىرىتى پروزە (⁄ ا مار □	۲- بوان ه		
	و موسي (۰) ا	منوسط (۵۰) ت	حوب(۲۵) امتیار لط با کارف ما در جنت اجرای) امتیاز 🗅 ساندانه متعادا	عالی (۱۰۰		
	نا مناسب (٠) 🗆	چي⊷ن متدسط (۵۰) □	ن به مرکزت در بهت ۲۰، در ای خون (۷۵) امتیا: 🕅	سەرسىنى وىمەم)اەتىا: □	<u>م ارتدر</u>		
		موب(زمانېندې پروژه)	ییمان و منطبق یا برنامه مم	، سیبر نے مدیریت زمان	عالی رو او ۶- احد او		
	نا مناسب (٠) 🗆	متوسط (۵۰) 🗆	ن و ر ۲۵) امتیاز 🖬) امتياز 🛛	عالي (١٠٠		
	یی (قبلی):	نام دستگاه کارفرما		نام مناقصه کر			
فوطليع	صاحب امضا مجاز دستگاه کا ر ا	نام و نام خانوا د کی مدیر این	·.	مهر و امضا			
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بدينوس	له اعلام	م مــــی دارد شـــرکت/	<u>ن</u> ای	بيمسان شىسما	<u>ب_</u>
مەض بە ع			میلیغ	ریال را از تیاریخ	تــا تــارىخ بــه
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ترک بالای لاز نبد هلیم لزاد بر کو بالای لاز نبد هلیم لزاد بر خوب الدی بالای باز نبد هلیم لزاد بر بونو الدی به الدارم الدی الم فرز فسر کتا آقیای مدت الدی منافر کر کن کار فرای این مجموعه به العام رسانیده و مواد فیل به عنوان ارز ایلی حس سایته شرکت مذکور اعلام می گردد. مدت الدی کننده فرمز اعلام ایل کر کر کن کر کر کر کن کر کر کن کار کر کن کار مراح الم می گردد. ام شرکت کار فرایی آیک کند الم کر کر کن کر کر کر کن کر کر کن کار تری ال به عنوان ارز ایلی حس سایته شرکت مذکور اعلام می گردد. مدت الدی کننده فرمز اعلام اسا معاور ایل معنوبی از کار کر کن کار حرک (کر کن کار کر کن کار کر ایل الم الم الم ک ام شرکت کار فرایی آیک کنده فرمز اعلام الم الم معاور الم الم معاور الم الم معاور الم الم الم کر کن ام شرکت کار فرایی آیک کند الم کر کر کر کر کر کر کر کن کار کر کن کار کر کن کار کر کن کار کر کن مدت تا ید کننده فرمز اعلام الما معاور الم معاور الم الم الم معاور الم الم الم الم کر الم شرکت کار فرایی آیک کند الم کر کن کر کر کر کر کر کر کن ام شرکت کار فرایی آیک کند الم کار کن تحت سر پر منی عالی (۱۰) المتیاز ال خوب (۲۵) المتیاز ال متوسط (۵) الما معاور الم					
نام شرکت ک	العلام. بدیتوسیله اعسلام عسی دارد نسر ک ^ی اقسای				
نام و نام خان	نوادگی تایید کن:	ننده فرم:(صاحب امضا مجا) ایرسور می رک		ىيل اين بخش الزامي است).
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۱-کیفیت ا	جراي کار				
عالی (۱۰۰) ا	امتياز 🛛	خوب(۲۵) امتیاز 🗆	متوسط (۵۰) 🗆	نا مناسب (٠) 🛯	
۲-کفایت کا	ادرفني				
عالی (۱۰۰) ا	امتياز 🗹	خوب(۲۵) امتیاز 🗆	متوسط (۵۰) 🗆	نا مناسب (۰) 🗆	
۳-رعایت <	حقوق مادی و م	معنوى كاركنان تحت سرپ	ستى		
عالی (۱۰۰) ا	امتياز 🖪	خوب(۷۵) امتیاز 🗆	متوسط (۵۰) 🛛	نا مناسب (٠) 🗆	
۴- توان مد	یریتی پروژه (ر	زرئیس کارگاه ،نماینده پیم	نکار)		
عالی (۱۰۰) ا	امتياز 🗹	خوب(۷۵) امتياز 🗆	متوسط (۵۰) 🗆	نا مناسب (٠) 🗆	
۵- رفتار س	بازمانی و تعامل	ن با کارفرما در جهت اجرای	پيمان		
عالی (۱۰۰) ا	امتياز 🖻	خوب(۷۵) امتياز 🗆	متوسط (۵۰) 🛛	نا مناسب (٠) 🗆	
۶- اجرای م	ىدىرىت زمان پى	پیمان و منطبق با برنامه م	موب(زمانبندی پروژه)		
عالی (۱۰۰) ا	امتياز 🗖	خوب(۲۵) امتياز 🗆	متوسط (۵۰) 🗆	نا مناسب (٠) 🗆	
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	جناب آقای حمید عابدین زادگان
	مدیر عامل محترم شرکت تراوش جم
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ظهر ارائه Logic سیستم کنتر اور بهاده سازی آن و رام اندازی.	یا سلام اجتراما این امید از مملک در شبکت تیایش جریب می
استرو ارتبعه ما مرکز به عمل می آید. زخمات آن شرکت تشکر به عمل می آید.	سیستم بخار پروژه فاز ۲، رضایت داشته و بدینوسیله از ز
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خلیل زاده، شماره ۱۷٪ تلفن: ۵ – ۸۸۷۸۶۹۹۲ (۲۱) فکس: ۶ -۸۷۷۷۵ (۲۱)	آدرس: تهران، خیابان ولیعمر، بالاتر از میدان ونک، کوجه شهید
Address: No.17, khlilzadeh St., Vali-e-Asr Ave., Vanak Sq., Tehran-Irar نلفن: (۲۹۰-۲۱) ۲۲۰۲۰ (۲۰۱۰ (۲۰۱۰) (۲۰۲۰) (۲۰۱۰-۲۰۱۵)	n Tel: +98 (21) 86786992-5 Fax: +98 (21)86777506 آدرس: ماهشهر ، منطقه ویزه افتصادی پتروشیمی ، سابت ۲
Address: Siter, Petrochemical Special Economic zone(Petzon	Ke). Marsher Tel: 061-521-22750 Fax: 061-521-22030