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

آگهی فراخوان مناقصه عمومی یک مرحله ای شماره RND-0318030-MD

تحت عنوان خرید الکتروموتور

چاپ نوبت اول: ۱۴۰۳/۱۰/۰۲ روزنامه اطلاعات

چاپ نوبت دوم: ۱۴۰۳/۱۰/۰۵ روزنامه اطلاعات

*** * مهلت دریافت اسناد استعلام ارزیابی کیفی و اعلام آمادگی: روز شنبه مورخ ۱۴۰۳/۱۰/۰۸ و آخرین مهلت ارسال پاسخ استعلام ارزیابی کیفی: روز شنبه مورخ ۱۴۰۳/۱۰/۲۲**

ارسال CD ارزیابی کیفی الزامی می باشد.

شماره فاکس:۳۴۱۶۶۰۱۳-۰۸۶

۳۳۴۹۱۵۰۷-۰۸۶

اخذ تاییدیه۳۳۴۹۲۸۳۵ -۰۸۶

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

شرکت /فروشگاه محترم ..... مناقصه عمومی یک مرحله ای شماره RND-0318030-MD

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

۱– جهت ارزیابی توان مالی

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

۱-الف : مالیات متوسط سالانه پرداخت شده (برگ تشخیص/ قطعی مالیات عملکرد ۱۰ ساله اخیر).

۲-الف : فروش یکسال گذشته (لیست خریداران شامل نام خریدار ،شرح کالا،مبلغ کالا)مستند به قراردادها و اسناد فروش با صورت های مالی تأیید شده.

۳-الف :مالیات متوسط سالانه مستند به اسناد مالیات های قطعی و علی الحساب پرداخت شده .

۴-الف : حداکثر تائیدیه کتبی اعتبار از طرف بانکها.

۵-الف :دارائیهای ثابت.

۶-الف متوسط بیمه سالانه(برای قراردادهای پیمانکاری).

۷-الف صورتهای مالی حسابرسی شده توسط سازمان حسابرسی یا موسسات حسابرسی مورد تائید .

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

ب: نحوه ارزیابی و امتیاز دهی توان مالی :

(مالیات متوسط سالانه×۱۰۰ / فروش یک سال گذشته / تأئیدیه کتبی اعتبار بانکی)=RI **برآورد**= ES

فرمول	امتیاز
۱/۲ × ES≤ RI	**۱۰۰**
ES≤ RI <**۱/۲** × ES	**۹۰**
./۸ × ES≤ RI <ES	**۸۰**
./۶× ES≤ RI <**./۸** × ES	**۷۰**
RI <**./۶** ×ES	**۶۰**

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

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

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

ج : ارائه مدارک مربوطه در خصوص دارا بودن نمایندگی

د : ارائه تائیدیه کالای فروخته شده

۳– جهت ارزیابی تجربی مدارک ذیل مورد نیاز است :

الف: ارائه اساسنامه شرکت یا پروانه کسب

ب : ارائه شماره اقتصادی / کد ملی

ت پروژه / خرید REQUEST.	رمز سازماني ADMIN	شماره انبار STORE NO		رمز مديريت MG . CODE	رمز عملكرد DESIGNATION	نوع سند MT		1403/8/27 :تاريخ
		اصلي	فرعي					2607 :شماره
RND-0318	48	93		**097**		**26**		

RE	نشانه تقاضا INDENT SYMBOL	اجازه خرج .WORK RLS	رمزفوريت URG. CODE	تاريخ نياز به كالا REQUIRED DATE	شماره حساب ACCOUNT NO
				1404/2/27	09790004701010842 50

مقدار REQ . QTY	شرح كالا DESCRIPTION	واحد كالا UNIT	شماره طبقه بندي كالا **MESC NO**	شماره قلم ITEM NO
1	الکتروموتور 1120 کیلو وات ضد انفجار 6 کیلو ولت	NO	....	01
0	مطابق با شرایط و دیتا شیت و Spec پیوست			
1	الکتروموتور 400 کیلووات ضد انفجار 6 کیلوولت	NO	....	02
0	مطابق با شرایط و دیتا شیت و Spec پیوست			
0				
0				
0				
0				
0				
0				

۵-۳ رده‌بندی و نشانه‌گذاری

۵-۳-۱ رده بندی بازدهی

رده بندی بازدهی برای موتورهای معمولی و ضد انفجار به ترتیب در جداول ۲ و ۳ آمده است.

جدول ۲ - رده‌بندی بازدهی برای موتورهای معمولی

رده انرژی	معادل کد IE	موتورهای معمولی
A^+	IE5	برای ویرایش آینده این استاندارد ملی در نظر گرفته شده است. به پیوست الف مراجعه شود.
A	IE4	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۴ دارند.
B	IE3	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۵ دارند.
C	IE2	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۶ دارند
D	IE1	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۷ دارند.
E	-	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۸ دارند.

جدول ۳ - رده‌بندی بازدهی برای موتورهای ضد انفجار

رده انرژی	معادل کد IE	موتورهای ضد انفجار
A^+	IE4	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۴ دارند.
A	IE3	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۹ دارند.
B	IE2	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۱۰ دارند.
C	IE1	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۱۱ دارند.
D	-	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۱۲ دارند.
E	-	موتورهای الکتریکی که در بارکامل (خروجی اسمی) بازدهی اسمی برابر با یا بیشتر از گستره داده شده در جدول ۱۳ دارند.

نوبت« »

شرکت پالایش نفت امام خمینی(ره)شازند(سهامی خاص)

آگهی فراخوان مناقصه عمومی یک مرحله ای شماره RND-0318030-MD

تحت عنوان خرید الکتروموتور

شرکت پالایش نفت امام خمینی(ره) شازند در نظر دارد تامین موضوع صدرالاشاره را از طریق مناقصه عمومی طبق اسناد مناقصه به تامین کننده واجد شرایط واگذار نماید. شرکتهای متقاضی می توانند جهت دریافت اطلاعات بیشتر و شرایط شرکت در مناقصه به سایت WWW.IKORC.IR مراجعه نمایند.

۱– موضوع مناقصه :

الف) شرح مختصر:

ردیف	شماره مناقصه	شرح مختصر کالا	تعداد	مبلغ برآورد (ریال)	مبلغ تضمین شرکت در مناقصه(ریال)
۱	RND-0318030-MD	خرید الکتروموتور	02دستگاه	۳۷۰/۰۰۰/۰۰۰/۰۰۰	۴/۰۷۸/۰۰۰/۰۰۰

ب) تضمین مورد قبول شامل : ضمانتنامه بانکی / واریز وجه نقد / چک بین بانکی / چک تضمینی

ج) مناقصه گزار در رد یا قبول هر یک یا تمام پیشنهادها بدون آنکه محتاج به ذکر دلیل باشد مختار است.

۲) کلیه اشخاص حقوقی واجد شرایط میتوانند مطابق تاریخ های ذیل جهت دریافت اسناد استعلام ارزیابی به آدرس اینترنتی فوق الذکر مراجعه نمایند و پس از دریافت اسناد و مطالعه آن ، مستندات ارزیابی کیفی را در قالب لوح فشرده در مهلت مقرر به آدرس ذیل ارسال نمایند . بدیهی است پیشنهاد هایی که با شرایط مندرج در فراخوان اختلاف داشته و ارسال مدارک مناقصه از سوی متقاضیان بعد از مهلت مقرر قابل پذیرش نمی باشد. پس از ارزیابی کیفی از متقاضیان تائید شده جهت ادامه فرآیند مناقصه دعوت بعمل خواهد آمد.

۳) مهلت دریافت اسناد :

۳-۱- مهلت دریافت اسناد استعلام ارزیابی کیفی: روز شنبه مورخ ۱۴۰۳/۱۰/۰۸

۳-۲- مهلت ارسال پاسخ استعلام ارزیابی کیفی: روز شنبه مورخ ۱۴۰۳/۱۰/۲۲

۴) نام و نشانی دستگاه مناقصه گزار: اراک، کیلومتر۲۰جاده بروجرد- دو راهی شازند- شرکت پالایش نفت امام خمینی (ره) شازند - اداره تدارکات کالا- اتاق ۱۱۸

تلفن تماس: ۰۸۶۳۳۴۹۲۹۰۹-۸۴۰

فکس: ۳۳۴۹۱۵۰۷-۰۸۶ یا ۳۴۱۶۶۰۱۳-۰۸۶

ایمیل ادرس: procurement@ikorc.ir

روابط عمومی شرکت پالایش نفت امام خمینی (ره)شازند

P_N kW	سرعت سنکرون (تعداد قطب) min^{-1}			
	۳۰۰۰ (۲)	۱۵۰۰ (۴)	۱۰۰۰ (۶)	۷۵۰ (۸)
۵٫۵	۸۹٫۲	۸۹٫۶	۸۸٫۰	۸۶٫۲
۷٫۵	۹۰٫۱	۹۰٫۴	۸۹٫۱	۸۷٫۳
۱۱	۹۱٫۲	۹۱٫۴	۹۰٫۳	۸۸٫۶
۱۵	۹۱٫۹	۹۲٫۱	۹۱٫۲	۸۹٫۶
۱۸٫۵	۹۲٫۴	۹۲٫۶	۹۱٫۷	۹۰٫۱
۲۲	۹۲٫۷	۹۳٫۰	۹۲٫۲	۹۰٫۶
۳۰	۹۳٫۳	۹۳٫۶	۹۲٫۹	۹۱٫۳
۳۷	۹۳٫۷	۹۳٫۹	۹۳٫۳	۹۱٫۸
۴۵	۹۴٫۰	۹۴٫۲	۹۳٫۷	۹۲٫۲
۵۵	۹۴٫۳	۹۴٫۶	۹۴٫۱	۹۲٫۵
۷۵	۹۴٫۷	۹۵٫۰	۹۴٫۶	۹۳٫۱
۹۰	۹۵٫۰	۹۵٫۲	۹۴٫۹	۹۳٫۴
۱۱۰	۹۵٫۲	۹۵٫۴	۹۵٫۱	۹۳٫۷
۱۳۲	۹۵٫۴	۹۵٫۶	۹۵٫۴	۹۴٫۰
۱۶۰	۹۵٫۶	۹۵٫۸	۹۵٫۶	۹۴٫۳
۲۰۰ تا ۱۰۰۰	۹۵٫۸	۹۶٫۰	۹۵٫۸	۹۴٫۶

۵-۵-۲ گستره نامی برای رده بازدهی B

برای این منظور به جدول ۱۰ مراجعه شود.

جدول ۱۰- گستره نامی بازدهی (٪) برای بازدهی رده B

P_N kW	سرعت سنکرون (تعداد قطب) min^{-1}			
	۳۰۰۰ (۲)	۱۵۰۰ (۴)	۱۰۰۰ (۶)	۷۵۰ (۸)
۰٫۱۲	۵۳٫۶	۵۹٫۱	۵۰٫۶	۳۹٫۸
۰٫۱۸	۶۰٫۴	۶۴٫۷	۵۶٫۶	۴۵٫۹
۰٫۲۰	۶۱٫۹	۶۵٫۹	۵۸٫۲	۴۷٫۴
۰٫۲۵	۶۴٫۸	۶۸٫۵	۶۱٫۶	۵۰٫۶
۰٫۳۷	۶۹٫۵	۷۲٫۷	۶۷٫۶	۵۶٫۱
۰٫۴۰	۷۰٫۴	۷۳٫۵	۶۸٫۸	۵۷٫۲
۰٫۵۵	۷۴٫۱	۷۷٫۱	۷۳٫۱	۶۱٫۷
۰٫۷۵	۷۷٫۴	۷۹٫۶	۷۵٫۹	۶۶٫۲
۱٫۱	۷۹٫۶	۸۱٫۴	۷۸٫۱	۷۰٫۸

P_N kW	سرعت سنکرون (تعداد قطب) min^{-1}			
	۳۰۰۰ (۲)	۱۵۰۰ (۴)	۱۰۰۰ (۶)	۷۵۰ (۸)
۱٫۵	۸۱٫۳	۸۲٫۸	۷۹٫۸	۷۴٫۱
۲٫۲	۸۳٫۲	۸۴٫۳	۸۱٫۸	۷۷٫۶
۳	۸۴٫۶	۸۵٫۵	۸۳٫۳	۸۰٫۰
۴	۸۵٫۸	۸۶٫۶	۸۴٫۶	۸۱٫۹
۵٫۵	۸۷٫۰	۸۷٫۷	۸۶٫۰	۸۳٫۸
۷٫۵	۸۸٫۱	۸۸٫۷	۸۷٫۲	۸۵٫۳
۱۱	۸۹٫۴	۸۹٫۸	۸۸٫۷	۸۶٫۹
۱۵	۹۰٫۳	۹۰٫۶	۸۹٫۷	۸۸٫۰
۱۸٫۵	۹۰٫۹	۹۱٫۲	۹۰٫۴	۸۸٫۶
۲۲	۹۱٫۳	۹۱٫۶	۹۰٫۹	۸۹٫۱
۳۰	۹۲٫۰	۹۲٫۳	۹۱٫۷	۸۹٫۸
۳۷	۹۲٫۵	۹۲٫۷	۹۲٫۲	۹۰٫۳
۴۵	۹۲٫۹	۹۳٫۱	۹۲٫۷	۹۰٫۷
۵۵	۹۳٫۲	۹۳٫۵	۹۳٫۱	۹۱٫۰
۷۵	۹۳٫۸	۹۴٫۰	۹۳٫۷	۹۱٫۶
۹۰	۹۴٫۱	۹۴٫۲	۹۴٫۰	۹۱٫۹
۱۱۰	۹۴٫۳	۹۴٫۵	۹۴٫۳	۹۲٫۳
۱۳۲	۹۴٫۶	۹۴٫۷	۹۴٫۶	۹۲٫۶
۱۶۰	۹۴٫۸	۹۴٫۹	۹۴٫۸	۹۳٫۰
۲۰۰ تا ۱۰۰۰	۹۵٫۰	۹۵٫۱	۹۵٫۰	۹۳٫۵

۵-۵-۳ گستره نامی برای رده بازدهی C

برای این منظور به جدول ۱۱ مراجعه شود.

جدول ۱۱- گستره نامی بازدهی (٪) برای بازدهی رده C

P_N kW	سرعت سنکرون (تعداد قطب) min^{-1}			
	۳۰۰۰ (۲)	۱۵۰۰ (۴)	۱۰۰۰ (۶)	۷۵۰ (۸)
۰٫۱۲	۴۵٫۰	۵۰٫۰	۳۸٫۳	۳۱٫۰
۰٫۱۸	۵۲٫۸	۵۷٫۰	۴۵٫۵	۳۸٫۰
۰٫۲۰	۵۴٫۶	۵۸٫۰	۴۷٫۶	۳۹٫۷
۰٫۲۵	۵۸٫۲	۶۱٫۵	۵۲٫۱	۴۳٫۴
۰٫۳۷	۶۳٫۹	۶۶٫۰	۵۹٫۷	۴۹٫۷
۰٫۴	۶۴٫۹	۶۶٫۸	۶۱٫۱	۵۰٫۹

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

فرم ارزیابی کیفی تامین کنندگان

مناقصه عمومی یک مرحله ای شماره RND-0318030-MD

تحت عنوان خرید الکتروموتور

A : توان مالی

ارزیابی بر اساس یکی از پارامترهای ذیل انجام می شود :

☐ درآمد /فروش سالانه	☐ اظهار نامه مالیاتی	☐ متوسط مالیات سالانه
☐ دارائی های ثابت	☐ تائید کتبی اعتبار بانکی	☐ متوسط بیمه سالانه

☐ صورتهای مالی حسابرسی شده : دارد ☐ ندارد ☐ میزان توان مالی میلیارد ریال

امتیاز کسب شده : ۶۰ ☐ * ۷۰ ☐ ۸۰ ☐ ۹۰ ☐ ۱۰۰ ☐

حداقل امتیازلازم : ۶۰

B : ارزیابی مشتریان قبلی ، حسن سابقه وتضمین کیفیت وخدمات محصولات

پارامترهای ارزیابی	عالی امتیاز۵	بسیارخوب امتیاز۴	خوب امتیاز۳	مورد تأیی نیست
کیفیت کالای مورد نظر مندرج در اسناد فنی ارائه شده		*		
خدمات وپشتیبانی			*	
انجام تعهدات(گارانتی)			*	

امتیاز۶۷

C : ارزیابی تجربی

سال تأسیس :

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

امتیاز سازنده کالا : ----

امتیازتامین کننده کالا : ۶۰

بر اساس ارزیابی مدارک فوق شرکت مذکور مورد تائید می باشد ☐

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

۱- عدم ارائه مدارک مالی ☐

۲- عدم ارائه مدارک حسن سابقه و .. ☐

۳- عدم ارائه مدارک تجربه و سوابق مربوط ☐

اولویت معیارها :

A	۲
B	۱
C	۲

فرمول %30(A+B) +%40B = امتیاز کل

امتیاز سازنده/تولید کننده کالا : ---

امتیازتامین کننده کالا : ۶۳

بررسی کننده :

JOB SPECIFICATION
FOR
ELECTRIC MOTORS

Rev.	Description	Date	Prepared	Checked	Approved	AC
01	Revised as Indicated as per NIOEC Comments	01-Jan-2007	M.Safakhah	K.Faraji	B.Amirani	
00	Issued For Approval	03-Dec-2006	M. Safakhah	K. Faraji	B. Amirani	C

8350-GEN-EED-SPC-0006 | POD: EX | POI: IFD | Status: IFA

File Ref. : T:\Issued Documents to Employer\Engineering Directorate\EE\SP-2260-60-002-1\SP-2260-60-002-1.doc

Preamble:

This Job Specification is an addendum to Basic Design Engineering Package, Project Specification no. SP-2260-60-2 which is addendum to Existing ARAK Project Specification no. SP-2219-60-2, and is issued for Detail Engineering phase.

The clause or section numbering used throughout this Job Specification is the same as those in Existing ARAK Project Specification.

Clauses not mentioned in this Job Specification remain unaltered.

16- Standard and Codes

The following sentence shall be added:

The phase sequence associated with the direction of rotating of the motor shall be clearly indicated on the motor terminals. Terminal markings shall be made in a clear and permanent manner according to IEC 60034-8.

8.1- Condensation Protection (Project specification)

Mentioned sentence shall be modified as per following sentence:
All MV motors shall be equipped with space heater.

JOB SPECIFICATION

FOR

ELECTRIC MOTORS

NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION CO. (NIOEC)

ARAK REFINERY EXPANSION AND PRODUCTS UPGRADING PROJECT

REV.	DATE	PAGE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	18-JAN-'05	ALL	FOR APPROVAL	H.F	T.Y	T.Y
1	28-MAR-'05	ALL	REVISED AS PER IOM-NIOECY-042	H.F	F.H	F.H
2	14-APR-'05	4 - 7, 12, 15	REVISED AS PER IOM-NIOECY-115 / FOR BDEP	H.F	T.Y	T.Y

DISTRIBUTION

PM
EM
AEM
PCM
PJE
CE
PROCESS
HSE-NOISE
HSE-FIRE
CIVIL
EQUIP
ROTARY
FURNACE
PACKAGE
BUILDING
PIPING
INSTRUMENT
ELECT
PAINT/INSU
DHT
PPM
PURCH-1(EQ)
PURCH-1(P)
PURCH-4(E)
PURCH-4(I)
EXPED'G
SHIPPING
CONST
QA
QC
LEGAL
ADMI
SALES

INDRA 14-APR-2005

Contents

SCOPE

1.1 This specification covers design, construction and testing of three phase squirrel cage induction motors suitable for Arak Refinery Expansion Project in Iran.

1.2 For motor sizing, reference shall be made to the specification of the respective driven equipment.

2.0 STANDARDS AND CODES

2.1 Motors shall be designed, constructed and tested in accordance with the pertinent sections of the latest editions of the standards and codes, as stated below, or elsewhere in this specification.

2.2 Motors shall generally comply with the requirements of International Electrotechnical Commission (IEC) standards, with particular reference to IEC 60034-1 to 60034-18, IEC 60085, IEC 60072, IEC 60079, IEC 60529.

2.3 Pertinent codes & standards of ANSI, API, ASME, NEMA, NFPA & UL will be acceptable for motors manufactured in USA, with particular reference to API 541 & 670, ASME B17.1 & B106.1M IEEE 841, NEMA MG1 & 2, NFPA 70 (NEC) & UL674B.

2.4 Where reference is made to any standard and codes other than IEC, it is understood that the equivalent IEC standard is also acceptable.

2.5 Reference shall be made to NIOEC SP-2260-47-310 for noise level and measurements.

3.0 AMBIENT CONDITIONS

All electric motors shall be designed and manufactured, to be suitable for their particular service & operational requirements, under the following site conditions:

Site Condition:	
Site elevation	1878 meters above sea level
Ambient temperature	MAX. 43°C MIN.-28°C
Design Relative Humidity	MAX. 100%
Climate	Tropical and dusty

4.0 RESPONSIBILITIES

4.1 When motors are furnished with the driven equipment as a package, the torque characteristics and speeds are the responsibility of the driven equipment vendor.

4.2 When motors are directly ordered by the purchaser, the torque characteristics and speeds will be supplied with the Request for Quotation and/or Purchase Order.

5.0 DESIGN AND CONSTRUCTION

5.1 Voltage and Output Rating

If not specified otherwise, the following low voltage (LV) & medium voltage (MV) levels shall apply to motors in the categorized ranges of KW rating:

Rating	Voltage	Phase	Frequency	Type of Conn.
Less than 0.4kW	230V or 400V	1 3	50Hz 50Hz	- Delta
0.4kW to 150kW	400V	3	50Hz	Delta
over 150kW	6000V	3	50Hz	Star
Special Motors	10000V	3	50Hz	Star

The motors used for critical services (compressor auxiliaries, lube oil systems, special pumps, etc.) shall be rated at 400 volts, 3 phase even if they are less than 0.4kW.

5.2 Voltage and Frequency Variations during Operation

Motors shall be capable of operating continuously on a power supply stated in 5.1 with the voltage and frequency variations as specified in IEC 60034-1.

5.3 Starting Conditions

5.3.1 Method of motor starting will be direct on line, unless otherwise specified in the data sheet.

5.3.2 The motor design shall normally allow at least three consecutive starts from cold against full load torque without injurious heating of insulated windings.

5.3.3 The starting performance shall be design "N" as per IEC 60034-12 for motors up to 150kW. For loads requiring high torque and for all loads above 150kW motors of high starting torque equivalent to design "H" shall be utilized.

5.3.4 Motors shall have sufficient starting torque and thermal capabilities to overcome the load inertia for starting and accelerating the connected load to the rated speed at 80% of the nominal voltage, without injurious heating.

5.3.5 The minimum accelerating torque shall be at least 30% more than the torque required by the load, at starting and pull up stage, when the applied voltage is 80% of the nominal voltage.

5.4 Miscellaneous Requirements

5.4.1 Motors designed for horizontal service shall not be used in vertical service (e.g. air cooled heat exchangers).

5.4.2 Where vertical motors of symbol "IM V3" or "IM V6" as per IEC 60034-7, are specified, the following precautions shall be taken to preclude water ingress through mechanical gaps, motor shaft, etc.

a) Flinger ring shall be provided on the motor shaft directly above the motor housing. The flinger ring shall be installed with adequate fit to divert water away from the shaft and bearing enclosure under running and stop condition of motor.

b) Grease nipple or bearing cover fixing bolts etc. shall not be located where there is any possibility of water accumulation. Motors for such service will be identified by Purchaser to driven machine Vendor.

c) Drain hole with suitable blind plug shall be provided at the bottom of the motor enclosure.

6.0 CONSTRUCTION

6.1 Electric motors, supplied in accordance with this specification, shall meet the requirements of the area classification, and enclosure ingress protection, as defined in the relevant data sheet and in compliance with the applicable sections of the latest edition of the pertinent standards and codes. The motor enclosure and fan cover material shall be cast or nodular iron, cast steel or steel plates with proper protective coatings. Any special requirements will be indicated on the motor data sheet.

6.2 Degree of Protection shall be as follows:

a) Motors for outdoor use : IP55 as per IEC 60034-5

b) Motors for indoor use : IP54 as per IEC 60034-5

Terminal box for the motor shall have the same degree of protection as of motor enclosure.

6.3 Motor for Hazardous Areas

a) Motors to be used in Class I, Div.1 Group C or D areas shall be flameproof Exd-IIB-T3 unless more stringent temperature class is specified. Where hydrogen is also present, Exd-IIC (not Exd-IIB) shall be used.

b) Motors to be used in Class I, Div.2 areas, indoors, shall be totally enclosed fan cooled (TEFC), increased safety (Exe) in accordance with IEC recommendation 60079-7 or equivalent national standards and suitable for the appropriate gas groups in Class I, Div.2 areas and hence shall cope with the limiting temperature groups T1 through T6 as specified in the relevant data sheets.

c) All single-phase motors shall be flameproof (Exd) throughout process, utility and tankage areas.

6.4 Motor for Non-Hazardous Areas

a) Motors to be used in non-hazardous areas shall be TEFC, standard industrial type.

b) All single-phase motors outside process, utility and tank farm areas shall be standard industrial type.

6.5 The manufacturer shall submit certificates issued by recognized certifying organization for flameproof (Exd) increased safety (Exe) motors.

6.6 The main dimensions of motors shall be in accordance with the IEC 60072.

7.0 INSULATION SYSTEM

7.1 Insulation materials shall be class F in accordance with IEC 60034-18. Temperature rise shall be limited to class B at 40°C ambient.

7.2 Motors shall be of continuous running duty, i.e, Duty type S1.

7.3 Motors shall be suitable for continuous operation on an ungrounded system.

7.4 Windings shall be adequately braced to prevent any relative movement under operating conditions, and in particular the stator windings of direct on line starting squirrel cage induction motors shall be properly braced to withstand start-up shocks.

7.5 The windings, particularly in case of medium voltage motor shall be of form wound copper and shall withstand an external three phase bolted fault at full load and 110% of rated voltage. Random windings are not acceptable for medium voltage motors.

7.6 The winding insulation shall be suitable for restarting of the motor immediately after power interruption, caused by residual voltage at 40% of the nominal voltage. The restarting operation should be possible with system voltage at 80% of the rated voltage.

7.7 All insulated windings shall be non-hygroscopic, oil resistant and the materials shall be resistant to flame propagation.

8.0 CONDENSATION PROTECTION

8.1 All motors, except for 0.4kW or less, shall be equipped with space heaters.

8.2 Space heater voltages shall be as follows:

a)	3000 watts or less	230 volt, single phase
b)	Over 3000 watts	400 volts, three phase

8.3 The maximum sheath temperature of anti-condensation space heaters shall not exceed 200°C, and it shall be less than the maximum temperature of the respective temperature class as specified in the data sheet of the relevant motor.

8.4 Space heater leads shall be brought out to a junction box separate from the main power terminal box or the junction boxes of other auxiliary devices.

9.0 RESISTANCE TEMPERATURE DETECTORS

9.1 Motors 750 kW and larger shall have at least six (2 per phase), resistance temperature detectors (RTD) in the stator windings.

9.2 The RTD shall be Pt 100 Ohm at 0°C, 3 wire type.

9.3 RTD'S shall be wired to a junction box separate from main terminal box or space heater or other auxiliary equipment junction box.

10.0 MOTOR DIFFERENTIAL PROTECTION

Motors above 1000 KW shall have three 50/5 ratio window type current transformers, supplied and mounted in the main power terminal box for differential protection of the motor windings. Motor lead T1 and T4 shall pass through one CT, leads T2 and T5 through the second CT, and T3 and T6 through the third CT. Lead ends T4, T5 and T6 are then connected together for the "WYE" point. Each CT's secondary terminal shall be brought to terminal strip located in the main power leads terminal box. The differential relay will be supplied by others and located in the motor control center.

11.0 SURGE PROTECTION

Appropriate surge protection devices, such as suitable capacitors connected from line to earth at machine terminals shall be provided for all medium voltage motors with high outputs. However, these motors shall be suitable for operation to withstand lightning and other surges without any surge protection.

12.0 BALANCING, VIBRATION, AND NOISE LEVEL

12.1 Motors shall be dynamically balanced. The use of solder or similar deposits for balancing is not acceptable. Parent metal removal to achieve balance shall be carried out in such a way as not to affect the structural strength of the rotating element.

12.2 Vibrations shall be measured on the bearings along the three axis, and shall not exceed the limits specified in IEC 60034-14.

12.3 Noise level shall be in accordance with the requirements stated in data sheet. If there is no specific requirement found in such document, the noise level shall not exceed 85 db(A) when motors are running at no load.

13.0 BEARINGS AND LUBE OIL SYSTEM

13.1 General

12.1.1 Bearings shall be of the anti-friction, sleeve or thrust type as required and approved

for the application. They shall be in metric sizes with maximum interchangeability and shall comply with ISO recommendations.

12.1.2 Grease lubricated integral horsepower motors shall have bearing housings supplied with threaded fill and drain openings. Openings shall be plugged. Grease type bearing housing shall be equipped with fittings so that old grease will be forced out of the bearing as new grease is added. Grease nipples or plugs shall be provided.

12.1.3 Pre-lubricated ball bearings are acceptable, provided that the service life is not less than 40,000 working hours without regreasing.

12.1.4 Oil lubricated bearings shall be provided with oil lubricators with constant level reservoir(s), or a gear driven oil pump (fitted with device indicating Oil flow) if such is preferred by the manufacturers. Oil throwers or seals of suitable design shall be provided to prevent the escape of oil from the bearing housing.

13.2 Ball & Roller Bearings

The calculated life for ball and roller bearings ("90% survival" under the estimated bearing loads) should comply with the following requirements.

UP to 75 KW	15,000 hrs
75 KW to 250 KW	25,000 hrs
250 KW and over	50,000 hrs

13.3 Sleeve Bearings

12.3.1 Oil lubricated bearings shall have reservoirs of generous capacity effectively covered so no dust or other foreign materials can enter the bearing. Oil slingers and catchers shall be designed to prevent the escape of oil from the bearing and creepage along the shaft. Reservoirs shall be provided with drains, tapped fill openings and separate level gauge glasses. A permanent indication of proper oil level shall be provided. For sleeve bearings the end floats shall be within the limits specified by the driver machine Vendor.

12.3.2 Sleeve bearings shall normally be fitted with oil rings, discs or other suitable means of lubrication. Alternatively, lubrication may be provided directly by a gear driven pump. In all cases a transparent oil indicator or a device indicating oil flow shall be fitted.

12.3.3 100 mm dial type temperature indicator should be provided to indicate bearing oil temperature on each bearing, at a visible level, with mechanical protection at motor frame opposite cable connection box.

12.3.4 The design of thrust bearings for vertical motors shall be submitted for purchaser's approval. Vertical motors shall have thrust bearings suitable for the thrust load imposed by the driven machine. Bearings shall be rated for a minimum 1 year (5 years average) life, according to ISO B.10.

13.4 Forced Feed Lubrication Motors

Forced feed lubrication systems shall be provided on motors only when it is the motor manufacturer's recommendation and standard practice. When a forced feed lubrication system is furnished, complete information and details shall be furnished with the quotation. Oil pressure lubrication system for bearings shall conform with the following minimum requirements:

12.4.1 The main lube oil pump may be driven from the motor shaft. Auxiliary lube oil pump and electric motor shall be interlocked to assure adequate oil pressure to the motor bearings for start up or emergency.

12.4.2 Lube oil systems shall be arranged with dual oil filters, switchover valves and oil pressure gauges to indicate pressure differential across the filter.

12.4.3 Oil filters shall be replaceable while motor is in service.

12.4.4 A pressure switch shall be installed in the lube oil pump discharge for alarm and control functions. Contacts shall be separate for each function.

12.4.5 If bearings are insulated, the motor manufacturer shall furnish insulating fittings in the oil supply connections to prevent the oil supply lines from by-passing the bearing insulation.

13.5 Non-Forced Lubrication Motors

The bearing housing of motors with non-forced feed oil lubrication shall have oil reservoirs of sufficient depth to serve as setting chambers. Housings shall each be fitted with an adjustable constant level, and with sight feed oiler or a sight gauge, mounted on the housing and marked with the proper oil level. The oil system shall meet the following requirements:

a) The oiler bottle shall be of plastic or Pyrex glass. Plastic bottles shall be of a plastic inhibited against sunlight attack.

b) The oil system shall have sufficient surge capacity to absorb without over flowing oil form the bearing, when motor is stopped.

c) Bearing housing shall be provided with fill and drain openings accessible from outside the motor enclosure, necessary slingers, equalizers, vents, or other devices to prevent loss of lubricant.

13.6 Lubricants

Lubricants which will be used on site will be selected from the recommendable lubricant list to be supplied by the motor manufacturer. Grease lubricated bearings shall be packed with the manufacturer's recommendable lubricant before the motor is dispatched.

13.7 End Thrust

Vertical motors shall include suitable bearings to withstand the thrust of motor rotor. Where the motor is subject to external thrusts, in addition, e.g. from the driven machine, then full particulars of these external forces shall be supplied by the purchaser.

14.0 ROTOR (SQUIRREL CAGE)

14.1 Rotor Cage Built From Conductors Brazed to End Rings

Adequate means should be provided to eliminate the risk of sparking during starting and running. Particular attention must be paid to the following points:

a) The conductors throughout the length of the rotor core shall be mechanically tight with respect to adjacent stampings.

b) The joints between conductors and short circuiting rings shall be brazed or welded and compatible materials shall be used to enable quality joints to be made.

c) The whole rotor construction shall be such as to avoid fracture of conductors, joints or short circuiting rings throughout the life of the motor.

d) Where the type of construction employs impregnating varnish to provide the necessary degree of tightness, the manufacturer must ensure that full penetration of the varnish has been achieved and that the grade of varnish is suitable for the design temperature and operating conditions.

The manufacturer shall, upon request by the purchaser, demonstrate what positive means have been adopted to meet the above requirements.

14.2 Cast Rotor Cage

The soundness of cast rotor cages shall be established by test. The method of test being subjected to agreement between the manufacturer and the purchaser. Generally, only smaller rotors shall be of die-cast type.

14.3 The rotor cage shall be made of copper. It shall be free from excessive inherent axial thrust. Rotor shall be dynamically balanced (a) with half depth keys or (b) with the motor half-coupling keyed on the shaft.

14.4 The rotor design shall allow for the addition of balancing weights, which shall not be of lead or similar unstable material.

14.5 The shaft ends shall be provided with a suitably threaded hole or holes to facilitate the putting on of couplings, etc.

15.0 FANS

Fans for motors shall be made of non-sparking material.

16.0 TERMINAL BOXES AND MOTOR ACCESSORIES

16.1 All motors shall be supplied and equipped with terminal boxes for lead connections & cable terminations. The main power terminal box shall be positioned on the right hand side, when facing the driving end. For motors fitted with compound-filled cable terminations, the sealing box shall be positioned to accommodate cables which rise from the floor.

16.2 Terminal boxes, including removable covers, may be made of steel plates for motors rated over 150 KW and shall be cast iron for less than 150 KW. They shall be totally enclosed, and all joints shall be fitted with gaskets of polychloroprene or equivalent material to prevent the ingress of moisture and dust.

16.3 The short circuit capacity for terminal boxes shall be as per BS 4999, part 71.

16.4 Ample space shall be provided for cabling and changing connections but the design must be such that it is impossible for small parts to be dropped into the interior of the motor.

16.5 Terminals

15.5.1 All terminals shall be substantially designed. Line terminals shall be thoroughly insulated from the frames with material resistant to cracking.

15.5.2 Natural rubber insulation shall not be used for terminal leads.

15.5.3 Means shall be provided to prevent accidental reduction of clearances at terminals.

15.5.4 Terminal identifications shall be in clear and permanent markings.

15.5.5 Motors which are only uni-directional shall have the direction of rotation clearly indicated on the motor frame, together with the phase sequence of terminal connections associated with the rotation.

15.5.6 Studs shall be designed & fixed, so as to prevent their turning when nuts are tightened.

15.5.7 Adequate means shall be provided to prevent slackening of terminal connections due to vibrations. Connections having pinch screws bearing directly on the cable will not be acceptable.

16.6 Cable Entries

15.6.1 Each terminal box shall have cable entries with threads of ISO form according to IEC 60423. The number and size of hub on each terminal box will be indicated on motor data sheet.

15.6.2 For all forms of cable connection it must be possible to remove the motor without breaking or stressing the seal or the cable.

16.7 Lifting lugs shall be provided for each motor weighting more than 30kg.

16.8 All motors shall be equipped with an earthing terminal connection on motor frames as well as internal and external surface of each terminal box.

17.0 SURFACE COATING & PAINT

17.1 Prepared surfaces shall be free from rust, scale, sand, dust, and grease before painting.

17.2 Finish shall be manufacturer's standard for tropical use, and in accordance with relevant job specification on painting. For corrosive environments or areas subject to chemical spillage, painting shall be suitable for such applications.

18.0 TEST & INSPECTION

18.1 General

The motors shall be factory tested on the completed machine. The tests shall include but not limited to the following, and shall be carried out in accordance with IEC-60034.

18.2 Routine Tests to be carried on every motor

1) Measurement of winding resistance
2) Measurement of no load losses and current
3) Measurement to allow calculation of locked rotor current
4) Withstand voltage test plus insulation resistance test
5) Vibration measurement at no load
6) Direction of rotation
7) Dimensional inspection

18.3 Additional Tests to be carried out on one of the same design of M.V. motor.

1) Temperature rise test (Full load heat run)
2) Measurement of slip at full load
3) Measurement to allow calculation of torque-speed characteristics
4) Measurement to allow calculation of efficiency at full load, three-quarter, and half load
5) Measurement to allow calculation of power factor at full load, three-quarter, and half load
6) Measurement of noise

18.4 All testing that require voltage on the motor shall be carried out using full motor voltage. If it is not practical, due to the limitation of the shop test facilities, Vendor shall propose his alternative testing procedure.

18.5 Purchaser and/or his appointed inspectors reserve the right for inspections at any stage of equipment manufacture, testing or preparation for shipment.

18.6 Manufacturer shall notify purchaser to witness test at least two weeks before the date of test performance.

18.7 Inspection by purchaser shall in no way release the manufacturer from guarantees on the workmanship, materials and performance of the equipment supplied.

19.0 NAMEPLATE

19.1 Nameplates shall be of stainless steel or other equivalent durable material. They shall be located so as to be easily legible and fixed to a non-removable part of the frame with the stainless steel screws.

19.2 Minimum information on the nameplate shall be according to IEC 60034-1.

19.3 Ex motors shall be provided with additional marking plate indicating.

- Type of protection
- Apparatus group
- Temperature class
- Name of certifying organization
- Certificate number.

19.4 When special features are embodied, a plate showing appropriate instruction shall be affixed to each motor.

19.5 Type of oil and instruction for sight oiler adjustment should be indicated on a separate data plate.

19.6 Labels for direction of rotation shall be mounted on both ends of the motor frame.

19.7 For space heater terminal boxes on motors a sign shall be included that states “Caution – Space Heater fed from alternative supply”.

20.0 INFORMATION TO BE SUPPLIED AT TIME OF QUOTATION

Information to be supplied by the manufacturer with tender for electric motors, shall be as follows and as required in the data sheet of the relevant motor:

1) Rated output (KW)
2) Rated voltage, phase and frequency
3) Number of poles

4) Cooling method
5) Degree of protection
6) Type of protection (for hazardous area use)
7) Direction of rotation if unidirectional
8) Manufacturer's standards indication of:
   a) Make
   b) Type (mounting and enclosure)
   c) Frame size
9) Applicable standard
10) Design ambient temperature and altitude
11) Winding, Star or Delta
12) Rated current at full load
13) Torque-speed characteristics curve
14) Full load torque
15) Starting torque, in percent of full load torque
16) Starting current, in percent of full load current
17) Permissible locked rotor time at 100% voltage and 80% voltage
18) Moment of inertia (J)
19) Starting time, coupled with driven machine.
20) Efficiency and power factor at:
   a) Full load
   b) 3 / 4 load
   c) 1 / 2 load
21) RPM at full load
22) Insulation class
23) Temperature rise by the thermometer and/or resistance method
24) Air gap (for sleeve bearing motor)
25) Bearings
   a) Type
   b) Make and size
   c) Method of lubrication
26) End play, DE and NDE
27) Terminal box arrangement
28) Coupling or pulley details where supplied
29) Weight
30) Dimensional sketch, including shaft details, with reference number
31) Recommended spare parts list, for 2 years operation
32) Recommended commissioning spares
33) Space heater voltage and power when applicable

21.0 SPARE PARTS

21.1 Spare parts shall be interchangeable, as far as practical, between different motors and suitable for use in place of the original parts and comply with the same specification and tests.

21.2 Recommended lists shall be submitted at the quotation stage for the following spare parts in accordance with the requirements in the requisition.

a) Commissioning spare parts
b) 2-year operation spares (for separate and later purchase)

22.0 DRAWING & TECHNICAL DOCUMENTS

22.1 Vendor shall submit the required drawings and technical documents in compliance with the requisition.

22.2 Motor Data Sheet shall be completed by the Vendor and submitted with his proposal.

23.0 PREPARATION FOR SHIPMENT

23.1 Electric motors shall be supplied with bearings lubricated.

23.2 Silica gel or other suitable dehydrating compound shall be enclosed in each motor package. Vents shall be waterproof sealed.

23.3 Preparation for shipment shall be in accordance with Manufacturer's standards, unless otherwise specified in the requisition and/or Purchase Order. The Manufacturer shall be solely responsible for the adequacy of the preparation and packaging for the required methods of shipment.

23.4 Rotors shall be locked to protect against damage during shipment.

23.5 Instruction shall be provided for lifting large motors and removal of protective & safety features used for shipment.

24.0 GUARANTEE

24.1 The supplier shall replace any damaged equipment resulting from poor workmanship and/or faulty design. The supplier shall also replace any equipment failed under the following conditions:

a) Failure under start-up and commissioning tests according to IEC recommendation.
b) Failure under normal usage fro a minimum of 12 months after being placed in the specified service, but not later than 36 months from the date of shipment.

JGC CORPORATION / TPL JOINT VENTURE	NATIONAL IRANIAN OIL COMPANY REFINERIES ENGINEERING AND CONSTRUCTION ARAK REFINERY PROJECT	NIOC NO. SP-2219-60-2			REV 4
		NIOC PROJ. NO. 2219	J/V PROJ. NO. 0-6000	UNIT NO. [illegible]	
	UNIT NAME: COMMON	J/V NO. S-00-1380-002		SH. 1	OF 9

JOB SPECIFICATION

FOR

ELECTRIC MOTORS

INCLUDES

NIOC SPECIFICATION NO. SP-60-2 REV. NO. 5

AND

DETAIL ENGINEERING ADDENDUM

APPROVED BY NIOC
DATE : 8/11/1990
SIGNATURE [signature]
XMITTAL NO. : X-JY/EY-1873

FOR CONSTRUCTION

REV.	DATE	PRE'D	CHK'D	APP'D	DESCRIPTION
5					
4	20 NOV '90	[illegible]		[illegible]	ISSUED FOR CONSTRUCTION
3	24 OCT '90	[illegible]	[illegible]	[illegible]	REVISED AS PER X-JY/EY-1714 AND M-JY/E) [illegible]
2	19 Sep '90	[illegible]	[illegible]	[illegible]	GUARANTEE PERIOD IS REVISED TO BE COMPATIBLE WITH COMMERCIAL CONDITION.
1	30 MAY '90	[illegible]	[illegible]	[illegible]	SHEET 9/9 WAS REPLACED PER NIOC COMMENTS ON X-JY/EY-1082
0	25 APR. '90	[illegible]	[illegible]	[illegible]	FINALIZED AT TOKYO/YIA MEETING (REF: M-JY/E) -0771)

JGC CORPORATION / TPJ JOINT VENTURE	NATIONAL IRANIAN OIL COMPANY REFINERIES ENGINEERING AND CONSTRUCTION ARAK REFINERY PROJECT	NIOC NO. SP-2219-60-2		REV 4
		NIOC PROJ. NO. 2219	J/V PROJ. NO. 0-6000	UNIT NO 00
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DETAIL ENGINEERING ADDENDUM

TO

NIOC SPECIFICATION SP-60-2 REVISION 5

ELECTRIC MOTORS

This addendum revises the below listed clauses of the referenced SP-60-2 Specification as follows:-

1.0 CLAUSE 1.0 PAGE 1 - "GENERAL"

Add the following section:-

For items not fully covered in this specification or NIOC standard specifications, reference shall be made to IEC 34, 72, 79 and/or API 541.

2.0 CLAUSE 2.4 PAGE 1 - "API-541"

Delete entire clause.

3.0 CLAUSE 2.5 PAGE 1 - "NIOC STANDARDS"

Delete entire clause and insert following:-

2.5.1 NIOC SP-2219-47-10, Noise Level Requirements and Measurements.

4.0 CLAUSE 4.1 PAGE 2 - "VOLTAGE AND OUTPUT RATING"

Delete entire clause and insert following:-

Rating	Voltage	Phase	Frequency	Type of Connection
Less than 0.4 KW	230 V or 400 V	1 3	50 Hz 50 Hz	- Delta
0.4 KW thru 150 KW	400 V	3	50 Hz	Delta
Above 150 KW	6,000 V	3	50 Hz	Star
Special motors	10,000 V	3	50 Hz	Star

Fractional horsepower motors for critical service (compressor auxiliaries, lube oil systems, special pumps, etc.,) shall be 400 volt, 3 phase.

5.0 CLAUSE 4.2 PAGE 2 - "SERVICE CONDITIONS"

Delete entire clause and insert following:-

Site conditions:-

Site Elevation	1878 meter above sea level
Ambient Air Temperature	Max. 43 °C Min -28 °C
Relative Humidity	85 % Maximum
Climate	Tropical and dusty

6.0 CLAUSE 4.4 PAGE 2 - "STARTING CONDITIONS"

Delete entire clause and insert following:-

The motor design shall normally allow at least 3 starts in quick succession from cold against full load torque (total time for 3 starts not exceeding 4 minutes) without injurious heating of insulated windings.

Method of starting will be direct on line unless otherwise specified.

The starting performance shall generally be design N as per IEC 34-12. For loads requiring high torque, motors of high starting torque equivalent to design H shall be utilized.

Motors shall be able to overcome starting load inertia as well as accelerating the load to rated speed under both rated and at 20 % reduced voltage conditions during starting without injurious heating.

7.0 CLAUSE 4.6 PAGE 3 - "DESIGN GENERAL"

Delete entire clauses and insert following:-

Motors with horizontal shaft shall not be used in vertical service (e.g. air coolers). In case where vertical motors of symbol "V6" as per IEC 34-7 are specified, the following special precaution shall be taken to preclude water ingress through mechanical gaps, motor shaft, etc.

a. Flinger ring shall be provided on the motor shaft directly above the motor housing. The flinger ring shall have adequate diameter and tightness.
The flinger ring shall be designed so as to direct water away from the bearing housing and to prevent water ingress along the shaft under both motor running and stop conditions.

b. Grease nipple or bearing housing fixing bolts etc., shall not be located where there is any possibility of water accumulation.

Motors for such service will be identified by Purchaser.

8.0 CLAUSE 5.0 PAGE 3 - "ENCLOSURES"

Delete paragraphs 5.2 and 5.3, and insert the following:-

a. Motors to be used in Class 1, Div. 1 areas shall be flame proof EXd-IIB-T3. Where hydrogen is present Exd-IIC-T3 enclosure shall be used.

For motors manufactured in USA, NEMA type 4X and 7 will also be considered.

b. Motors to be used in Class 1, Div 2 area shall be totally enclosed fan cooled (TEFC), IP 55 as per IEC 34-5 and shall meet the requirements of increased safety (EXe) in accordance with IEC recommendation 79-7 or equivalent national standards.

The increased safety motors shall be suitable for the appropriate gas groups in Division 2 areas and hence shall cope with the limiting temperature groups T1 through T6 as defined in IEC 79-7.

c. All single phase motors shall be flame proof EXd throughout process, utility and tankage areas.

d. Motors to be used in non-hazardous areas, outdoors, shall be TEFC with degree of protection IP 54 according to IEC 34-5.

e. In non-hazardous areas, indoors, standard industrial type motors, with degree of protection IP 54 according to IEC 34-5 shall be used.

Add also the following sections after the paragraph 5.6 (Page 4):-

The type of motor enclosures shall be marked on the motor nameplate according to IEC, and for motors installed in Division 2 area this statement shall be clearly shown "Suitable for Division 2 use".

The manufacturer shall supply certificates for motor enclosures which are specified flameproof or increased safety.

The motors shall have their main dimensions in accordance with the IEC recommendation.

In all cases terminal boxes for outdoor installation should have enclosure type IP 55.

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9.0 CLAUSE 6.3 PAGE 4 - "INSULATION SYSTEM"

Delete entire clause and insert following:-

All motors shall be designed to operate under unusual conditions of high temperature, high humidity, fungus, salty air, and corrosive vapors.

Insulation class shall be F.

Winding shall be adequately braced to prevent any relative movement during operating conditions and in this respect, particular attention is drawn to the stator windings of direct-on-line squirrel cage motors.

Motors shall be suitably treated to withstand the service conditions specified in Clause 4.2 where special service conditions are specified the motors shall, in addition, be impregnated and finished to withstand those conditions.

10.0 CLAUSE 7.0 PAGE 5 - "CONDENSATION PROTECTION"

Amend the space heater voltage as follows:-

3000 watts or less - 230 volt, single phase
Over 3000 watts - 400 volt, 3 phase

Delete entire clause 7.4

11.0 CLAUSE 8.0 PAGE 5 - "RESISTANCE TEMPERATURE DETECTORS"

Amend the rating of the resistance temperature detectors as follows:-

100 ohm at 0 °C platinum resistance temperature detectors.

12.0 CLAUSE 9.0 PAGE 5 - "MOTOR DIFFERENTIAL PROTECTION"

Delete entire clause and insert the following:-

Motors above 1,000 KW shall have three 50/5 ratio window type current transformers, supplied and mounted in the motor junction box, for differential protection of the motor windings only. Motor leads T1 and T4 shall pass through one C.T., lead T2 and T5 through the second C.T. and T3 and T6 through the third C.T. T4, T5 and T6 are then connected together for the "Wye" point. Each C.T. secondary terminal shall be brought to terminal strips located in the main power leads junction box. The differential relays will be at the motor control center.

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13.0 CLAUSE 10.1 PAGE 6 - "LIGHTNING AND SURGE PROTECTION"

Delete entire clause and insert following:-

Motors above 1000 KW will be controlled by vacuum circuit breakers. Vendor shall state guaranteed value of max. withstand surge for these motors in his proposal.

Motors 1000 KW and less will be controlled by combination type starters (HRC fuses and vacuum/magnetic contactor).

14.0 CLAUSE 11.1.3 PAGE 6 - "BEARINGS"

Delete entire clause.

15.0 CLAUSE 11.2 PAGE 7 - "SLEEVE BEARINGS"

Delete the first paragraph and add the following section:-

11.2.5 Sleeve bearings shall normally be fitted with oil rings, discs or other suitable means of lubrication. Alternatively, lubrication may be provided directly by a gear driven pump. In all cases a transparent oil level indicator shall be fitted.

16.0 CLAUSE 11.5 PAGE 8 "LUBRICANTS"

Delete entire clause and insert the following:-

Lubricants which will be used shall be subject to agreement between the manufacturer and the purchaser. Grease lubricated bearings shall be packed with the agreed lubricant before the motor is dispatched. Equivalent lubricants shall be proposed.

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17.0 CLAUSE 13.0 PAGE 9 - "MOTOR ATTACHMENTS"

Add the following paragraphs:-

13.12 An earthing terminal suitable for 35 mm^2 shall be provided, external to the terminal box unless otherwise stated.

13.13 400 volt motors should have cast iron end shields, cast iron cable boxes, cast iron or rust proof steel plate fan covers, gaskets between cable box covers and boxes, neoprene gaskets and lead seals between cable boxes and motor frames, and rotating shaft seals impervious to chemicals. For 400V motors (Exe and TEFC), aluminium alloy may be used instead of cast iron according to manufacturer's standard.

13.14 Other designs of manufacturer's standard may be accepted subject to NIOC approval.

13.15 Where heater or other additional connections are specified they should be brought out to a terminal box which is separate from the main terminal box.

13.16 Where cable sealing and dividing boxes are required, then clearance and creepage distances shall comply with the relevant IEC specifications. Main terminal box on 10 KV and 6.0 KV motors shall be made of steel.

18.0 CLAUSE 13.1 PAGE 9 - "MOTOR ATTACHMENTS"

Amend the second sentence as follows.

Looking at (facing) the driving end, terminal box shall be positioned on the right hand side or on the top of the motor frame where the cable enters the right hand side.

19.0 CLAUSE 13.3 PAGE 10 - "MOTOR ATTACHMENTS"

Delete entire clause and insert following:-

The short circuit capability for the terminal boxes shall be as per BS 4999, Part 71.

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20.0 CLAUSE 13.8 PAGE 11 - "CABLE ENTRIES"

Delete entire clause and insert following:-

13.8.1 Each terminal box shall have cable entry(ies) with threads of ISO form according to IEC 423.
The number and size of hub on each terminal box will be indicated on Motor Data Sheet.

13.8.2 The following cables will be employed;

For 10 KV motors ---- Copper conductor, 6/10 KV, XLPE/LC/SWA/PVC as per IEC specifications.

For 6 KV motors ----- Copper conductor, 3.6/6 KV, XLPE/LC/SWA/PVC as per IEC specifications.

For 400 V motors --- Copper conductor, 0.6/1 KV, PVC/LC/SWA/PVC as per IEC specifications.

13.8.3 Cable glands will be of a compression type and supplied by Purchaser.

21.0 CLAUSE 14.0 PAGE 11 - "FANS"

Delete entire clause and insert following:-

14.1 Fans for motors shall be made of non-sparking material.

22.0 CLAUSE 17.0 PAGE 12 - "TESTING"

Amend the second sentence of the paragraph 17.1 (page 12) as follows:-

Random complete tests including all items may exceptionally be requested by Purchaser, and also shall be required for one motor of each batch above 150 KW.

Add the following sentence after the paragraph 17.1 (page 12):-

The tests shall be witnessed by NIOC inspector and certified test reports shall be furnished.

Delete entire paragraph 17.1.c (Page 12) and insert the following:-

Measurement of winding resistance at cold.

Insert the following sentences after the paragraph 17.1.f (page 12):-

Measurement of slip at full load.
Measurement to allow calculation of starting torque.

23.0 CLAUSE 17.3 PAGE 13 - "TESTING VOLTAGE"

Delete entire clause and insert the following:-

All tests requiring voltage on the motor shall be carried out using full motor voltage. However for torque and locked rotor current determination reduced voltage may be used.

24.0 GUARANTEE

The supplier shall replace any damaged equipment resulting from poor workmanship and/or faulty design. The supplier shall also replace any equipment failed under the following conditions:-

a. Failure under start-up and commissioning tests according to IEC recommendation.

b. Failure under normal usage for a minimum of 12 months after being placed in the specified service, but not later than 36 months from the date of shipment.

25.0 DATA SHEET

Attached data sheet shall be completed by the vendor and be submitted with his quotation.

JGC CORPORATION
TPL JOINT VENTURE

NATIONAL IRANIAN OIL COMPANY
ARAK REFINERY PROJECT

DATA SHEET FOR INDUCTION MOTOR

ITEM NO. :				
QT'Y :				
P.O. NO. :				
REV.				
DATE				
PRP'D				
APR'D				

REQUIREMENTS AND CONDITIONS

SERVICE : OUTDOOR / INDOOR	
AREA CLASSIFICATION : CL. DIV. GROUP NON HAZARDOUS	
AMBIENT TEMPERATURE : MAX. 43 °C, MIN. -28 °C	
ALTITUDE : m	
RATED VOLTAGE : V, ph, 50Hz	
COOLING METHOD :	
DEGREE OF PROTECTION : IP	
TYPE OF ENCLOSURE :	
TEMPERATURE CLASS : T3 IEC Publication 79-7 or NEC	
TIME RATING :	
REQUIRED OUTPUT AT SITE CONDITION : KW	
SERVICE FACTOR : 1.0	
NO. OF POLES :	
TYPE OF MOUNTING :	
ROTATION (viewed from anti coupling side) CW / CCW	
STARTING METHOD : FULL VOLTAGE	
CONSTRUCTION CODE : IEC	
MAIN TERMINAL BOX THREAD SIZE : * mm	
MAIN TERMINAL BOX CABLE TYPE & SIZE : * mm^2	
	C.T. FOR DIFF. RELAY: REQUIRED / NOT REQUIRED
	C.T. RATIO :
	THREAD SIZE OF T.B. FOR C.T. : * mm
	NOISE : LESS THAN 86 dB(A)
	FINISH COLOUR :

	T.B. THREAD SIZE
SPACE HEATER : REQUIRED/NOT REQUIRED	* mm
WINDING TEMP DETECTORS : REQUIRED/NOT REQUIRED	* mm

DRIVEN MACHINE DATA

TYPE : PUMP/COMP./BLOWER/FAN/MIXER
CENTRIF./RECIPRO./ROTARY
MANUFACTURER :
COUNTER TORQUE :
B.H.P. : KW
MOMENT. OF INERTIA (GD^2): $Kg\cdot m^2$
REQ'D END PLAY : DE mm, NDE mm
THRUST : UP Kg, DOWN Kg
COUPLING METHOD : DIRECT/BELT/GEAR
HALF COUPLING : SUPPLIED BY MANUFACTURER
AT MOTOR SIDE FITTED BY MANUFACTURER

REMARKS: Vendor shall complete this data sheet.

* THE DATA MARKED * WILL BE ADVISED AFTER RECEIPT OF VENDOR'S DATA FILLED IN THIS FORMAT.

MOTOR MANUFACTURER'S DATA

MANUFACTURER :
MANUFACTURER ORDER NO. :
SERIAL NO. :
MOTOR DWG. NO. :
STANDARD : CONSTRUCTION FOR HAZARDOUS AREAS, PERFORMANCES, DIMENSIONS
TYPE AND/OR FRAME SIZE :
STATOR WINDING CONNECTION : STAR/DELTA
INSULATION CLASS & TEMP. RISE : INS. CLASS TEMP. deg-C
RATED OUTPUT/CURRENT AT SITE: KW A
RATED SPEED : rpm
POWER FACTOR : F.L. %, 3/4 LOAD %, 1/2 LOAD %
EFFICIENCY : F.L. %, 3/4 LOAD %, 1/2 LOAD %
LOCKED ROTOR CURENT : %
LOCKED ROTOR TORQUE : %
PULL UP/OUT TORQUE : UP % / OUT %
STARTING TIME : SEC. AT 80% VOLT/ SEC. AT 100% VOLT
PERMISSIBLE LOCKED ROTOR TIME : SEC.(COLD) SEC.(HOT)
MOTOR ROTOR INERTIA (GD^2) : $Kg\cdot m^2$
BEARING TYPE AND/OR NO. : DE , NDE
LUBRICATION SYSTEM : GREASE/OIL/SELF LUB./FORCED LUB
REGREASING INTERVAL :
END PLAY : DE mm, NDE mm
WEIGHT : ROTOR Kg, TOTAL Kg
SPACE HEATER : 230 V, 1 ph, 50 Hz, W

National Iranian Oil Company
Refineries Engineering & Const.

SPECIFICATION SP-60-2

SPECIFICATION FOR THREE PHASE SQUIRREL CAGE ELECTRIC MOTORS

The attached specification is the latest revision, as indicated below:

Rev.	0	Date	Dec. 67	Approved for Stds. Committee		Page	X
Rev.	1	Date	Nov. 68	Approved for Stds. Committee		Page	All
Rev.	2	Date	April 70	Approved for Stds. Committee		Page	All
Rev.	3	Date	July 71	Approved for Stds. Committee	S.H.	Page	All
Rev.	4	Date	June 74	Approved for Stds. Committee	M.R.B.	Page	All
Rev.	5	Date	Sept. 77	Approved for Stds. Committee		Page	All
Rev.		Date		Approved for Stds. Committee		Page	
Rev.		Date		Approved for Stds. Committee		Page	

NOTE: Specification Completely Revised.

SPECIFICATION SP-60-2

SECTION 1 - INDUSTRIAL AND FLAMEPROOF MOTORS

1.0 GENERAL

1.1 This specification covers standard 3 phase squirrel cage electric motors up to 1500 KW, for operation on supplies up to and including 6000 volts.

1.2 Motors shall be designed and tested for continuous operation and suitable for outdoor installation and refinery, chemical and similar services.

1.3 All electric motors supplied in accordance with this specification shall meet the requirement of the area classification.

1.4 In the reference number of this specification, "Purchaser" means National Iranian Oil Company in cases where this specification is part of a direct purchase order by National Iranian Oil Company and Contractor where this specification is part of Contract Documents.

2.0 STANDARDS & CODES

All motors shall be constructed and tested in accordance with all applicable sections of the latest listed standards and codes, as amended in this specifications, where reference is made in this specification to IEC standards and codes , it is understood that equipment standards and codes published by Nema are also acceptable.

2.1 Motors manufactured in Europe.

2.1.1 International Electrotechnical Commission (IEC). IEC 34 , 72 and 79

2.2 Motors manufactured in U.S.A.

2.2.1 National Electrical Manufacturers Association Std. for Motors and Generators (NEMA).

2.3 For equipment manufactured outside of Europe and U.S.A. either items 2.1 or 2.2 above must be met.

2.4 For all motors American Petroleum Institute (API) 541.

2.5 N.I.O.C. Standards:

2.5.1 N.I.O.C. SP-60-6 Section 4 Electric Motors (for application of motors).

2.5.2 N.I.O.C. SP-47-10 for acceptable noise levels.

2.6 ISO B-10 Calculated Bearing Life.

3.0 RESPONSIBILITIES

3.1 When motors are furnished with the driven equipment as a package, the torque characteristics and speeds are the responsibility of the driven equipment Vendor.

3.2 When motors are bought individually by the Purchaser, the torque characteristics and speeds will be supplied with the Request for Quote and Purchaser Order, and shall be in accordance with NIOC SP-60-6.

4.0 DESIGN-GENERAL

4.1 Voltage and output rating

Rating	Voltage	Phase	Frequency	Speed (rev/s)	Type of connection
Below.20KW (¼HP)	220	1	50 Hz	12.5,25	-
.20KW (¼HP) thru 150KW (200 HP)	380	3	50 Hz	or 50.	Star
Over 150KW (200 HP)	6000	3	50 Hz		Star

Fractional horsepower motors for critical service (compressor auxiliaries, lube oil systems, special pumps, etc.,) shall be 380 volt, 3 phase.

4.2 Service Conditions

Service Condition shall be specified in the Job Specification.

4.3 System Variations

Motors shall be capable of operating continuously at rated torque under the above conditions at any frequency between -5% and +2% of the nominal frequency together with any voltage between ±5% of the nominal rating.

4.4 Starting Conditions

The motor design shall normally allow at least 3 starts in quick succession from cold against full load torque (total time for 3 starts not exceeding 4 minutes) without injurious heating of insulated windings.

Method of starting will be direct on line unless other wise specified.

The following tables show required values of limits of starting current and torque based on direct-on-line starting at nominal voltage and are subject to a tolerance of -5% on torque and +7½% on starting current.

a. Normal Torque Motors

	Alternative Designs		
	1	11	111
Max. Starting current % FL	500	600	700
Min. Starting torque % FL	100	120	140
Torque during running up %FL	90	100	100
Stalling torque %FL	200	200	200

NOTE 1: Where D.O.L. starting is specified, design (1) is prefereed but motors may be accepted with higher starting current (up to a maximum of 700% FLC) provided that the starting torque is increased in the same proportion to obtain a more rapid acceleration and shorter starting time.

NOTE 2: Where reduced voltage starting is specified it is necessary to provide as high a starting torque as possible and design (III) is therefore preferred.

b. High Torque Motors

Max. Starting current %FL	650
Min. Starting torque % FL	225
Torque during running up % FL	200
Stalling torque % FL	200

In general this requirement will not be applied to 2 pole motors.

c. Motors shall be able to overcome starting load inertia as well as accelerating the load to rated speed under both rated and at 20% reduced voltage conditions during starting without injurious heating.

4.5 All motors, unless otherwise specified, are for coupled service.

4.6 Horizontal motors used in vertical service (e.g. air coolers) shall be equipped with a shaft sealing device which will preclude entry of moisture. Adequate means of drainage through the lower end bell shall also be provided. Motors for such service will be identified by Purchaser.

5.0 ENCLOSURES

5.1 All electric motors supplied in accordance with this spec

fication shall meet the requirements of the area classification in which it is to be installed as defined by the latest applcable sections of the herein mentioned standards and codes. Any special requirements will be indicated on the motor data sheet.

5.2 Motors used in Division 1 area indoor shall be explosion proof/flameproof, outdoor additionally weatherproof to IEC (IPW 54).

5.3 Motors for use in Division 2, and non-hazardous areas (outdoor or indoor) shall be as follows:

a. Totally Enclosed Fan-Cooled (TEFC) for all 380 volt motors. TENV (Totally Enclosed Non-Ventilated)acceptable below 5 HP. For outdoor use additionally weatherproof to IPW 54.

b. Increased safety in accordance with IEC 79-7 (Weatherproof). For outdoor use to IPW 54.

c. All single phase motors shall be explosion-proof.

d. 6000 volt motors shall be (TEFC) or outdoor weather-protected Type 11.

5.4 Motors specified as weatherproof shal require an additiona protection. Special attention shall be paid to joint gasketing and the provision of shaft water throwers.

5.5 6KV motors should be provided with space heaters.

5.6 On flameproof motors, means shall be provided for withdrawing end plates and cartridges housings (where fitted) in a manner which will avoid damage to flameproof flanges.

6.0 INSULATION SYSTEMS

6.1 Random wound open drip-proof motors shall have a sealed insulation system consisting of a complete encapsulation in an epoxy resin of the vacuum impregnated, molded or cast type.

6.2 Form wound motors shall have a sealed insulation system consisting of a complete encapsulation in an epoxy resin-mica compound impervious to moisture.

6.3 All motors shall be designed to operate under unusual conditions of high temperature, high humidity, fungus, salt air, and corrosive vapors. Vendor is advised to quote motors manufactured for operation under these conditions.
Class "B" insulation to be provided for all motors for ambient temperature below 50°C or below 1000 meter altitud
Class "F" insulation to be used for all motors for ambien temprature above 50°C or above 1000 meter altitude.

6.4 Stator windings shall be fully insulated for an unearthed system.

6.5 Adequate insulation shall be provided between coils of different phases which lie together.

7.0 CONDENSATION PROTECTION

7.1 All 6000 volt motors shall be equipped with space heaters. Space voltages are to be as follows:

3000 watts or less - 220 volt, single phase
Over 3000 watts - 380 volt, 3 phase

7.2 Space heaters shall have maximum sheath temperature of 200°C or as specified.

7.3 Space heater leads shall be brought out to a junction box separate from the main power leads junction box.

7.4 With the exception of fractional horsepower motors, all totally enclosed motors should be provided with a means of preventing the accumulation of moisture inside the motor.

8.0 RESISTANCE TEMPERATURE DETECTORS

8.1 Motors 750 KW and larger shall have six (2 per phase) 10 ohm at 25°C platinum resistance temperature detectors in the stator winding with the leads brought out to a terminal block in a junction box separate from the main power leads box.

8.2 A common junction box may be used for space heater leads and RTD leads.

9.0 MOTOR DIFFERENTIAL PROTECTION

9.1 Motors 1100 KW and above shall have three 50/5 ratio window type current transformers, supplied and mounted in the motor junction box, for differential protection of the motor windings only. Motor leads T1 and T4 shall pass through one C.T., lead T2 and T5 through the second C.T. and and T6 through the third C.T. T4, T5 and T6 are then connected together for the "Wye" point. Each C.T. secondary terminal shall be brought to terminal strips located in the main power leads junction box. The differential relays will be at the motor control center.

10.0 LIGHTING AND SURGE PROTECTION

10.1 Motors 1000 HP and larger shall be furnished with lightning arrestors and surge capacitors mounted in the main power leads junction box.

11.0 BEARINGS AND LUBE OIL SYSTEM

11.1 General

11.1.1 Bearings shall be of the anti-friction, sleeve or thrust type as required and approved for the application. Metric sizes with maximum interchangeability are preferred. Cartridge type housings are preferred.

11.1.2 Roller bearings should have machined yellow metal cages; ball bearings may be supplied with pressed steel cages.

Special attention shall be paid to ensure that the dismantling of bearings shall be simple and free from risk of damage.

11.1.3 Horizontal motors through 150 KW (200 HP) shall have grease lubricated ball bearings (Mfgr's standard). Motors 150 KW (200 HP) and above shall have split sleeve bearings. Sealed, prelubricated ball bearings are acceptable on fractional horsepower motors in non-critical services.

11.1.4 Grease lubricated integral horsepower motors shall have bearing housings supplied with threaded fill and drain openings. Openings shall be plugged. Grease type bearing housing shall be equipped with fittings so that old grease will be forced out of the bearing as new grease is added. Grease nipples or plugs shall be provided. Lubricators of the "Stauffer" type are not acceptable.

11.1.5 Pre-lubricated sealed bearings will be considered provided a full guarantee can be given for 4 to 5 years trouble-free service.

11.1.6 If oil lubricated bearings shall be provided with oil lubricators with constant level reservoir (s), or a gear driven oil pump (fitted with device indicating oil flow) if such is preferred by the manufacturers. Oil throwers or seals of suitable design shall be provided to prevent the escape of oil from the bearing housing.

11.2 Sleeve Bearings

Motors with sleeve bearings shall have provision for testing the air gap at each end of the motor, or the flameproof gland gap at each end of the motor in the cases of flameproof motors.

11.2.1 Oil lubricated bearings shall have reservirs of generous capacity effectively covered so no dust or other foreign materials can enter the bearing. Oil slingers and catchers shall be designed to prevent the escape of oil from the bearing and creepage along the shaft. Reservoirs shall be provided with drains, tapped fill openings and separate level gauge glasses. A permanent indication of proper oil level shall be provided. Sleeve bearing motors shall have a shaft end float of 12mm minimum.

11.2.2 100 mm Dial type temperature indicator should be provided to indicate bearing oil temperature on each bearing, at a visible level, with mechanical protection at motor frame opposite cable connection box.

11.2.3 The design of thrust bearings for vertical motors shall be submitted for Purchaser's approval. Vertical motors shall have thrust bearings suitable for the thrust load imposed by the driven equipment. Bearings shall be rated for a minimum 1 year (5 years average) life, according to ISO B.10.

11.2.4 Motors shall be equipped with suitable seals to prevent moisture from entering through the shaft opening.

11.3 Forced Feed Lubrication Motors

Forced feed lubrication systems shall be provided on motors only when it is the motor Vendor's recommendation and standard practice. When a forced feed lubrication system is furnished, complete information and details shall be furnished with the quotation. Oil pressure lubrication system for bearings shall conform with the following minimum requirements:

11.3.1 The main lube oil pump may be driven from the motor shaft. Auxiliary lube oil pump and electric motor shall be interlocked to assure adequate oil pressure to the motor bearings for start-up, coastdown or emergency.

11.3.2 Lube oil systems shall be arranged with dual oil filters, switchover valves and oil pressure gauges to indicated pressure differential across the filter.

11.3.3 Oil filters shall be replaceable while motor is in service.

11.3.4 A pressure switch shall be installed in the lube oil pump discharge for alarm and control functions. Contacts shall be separate for each function.

11.3.5 If bearings are insulated the motor vendor shall furnish insulating fittings in the oil supply connections to prevent the oil supply lines from by passing the bearing insulation.

11.4 Non-Forced Feed Lubrication Motors

Motors with non-forced feed oil lubrication: the bearing housing shall have oil reservoirs of sufficient depth to serve as settling chambers housings, shall each be fitted with an adjustable constant level, and with sight feed oiler or a sight gauge, mounted on the housing and marked with the proper oil level. The oil system shall meet the following requirements:

The oiler bottle shall be of plastic or pyrex glass. Plastic bottles shall be of a plastic inhibited against sunlight attack.

The oil system shall have sufficient surge capacity to absorb without overflowing oil from the bearing, when motor is stopped.

Bearing housing shall be provided with fill and drain openings accessible, from outside the motor enclosure, necessary slingers, equalizers, vents, or other devices to prevent loss of lubricant.

11.5 Lubricants

Oil lubricants used , shall be as specified in clause 18.3 . Grease lubricated bearings will be packed with Shell Alvania R2 or R3 (Exxon Beacon EP2, EP3) before the motor is shipped.

11.6 End Thrust

Where motors are supplied without thrust or location bearing, it is essential that motor manufacturers state this fact in their tender and on their drawings

and indicate also the permissible amount of end float in order that a suitable coupling may be supplied to keep the float within the specified limits. Vertical motors shall include suitable bearings to withstand the thrust of the motor rotor. Where the motor is to be subject, in addition, to external thrusts, e.g. from the driven machine, then full particulars of these external forces shall be supplied by the purchaser.

12.0 ROTOR

12.1 The rotor shall be free from excessive inherent axial thrust. It shall also be in good dynamic balance. Rotors shall be dynamically balanced (a) with half depth keys or (b) with the motor half-couplings keyed on the shaft.

12.2 The rotor design shall allow for the addition of balancing weights, which shall not be of lead or similar unstable material.

12.3 Fans shall be inherently balanced and shall be located so that it is impossible to assemble them incorrectly. They shall force the cooling air in the direction of the driving end and preferably be suitable for rotation in either direction.

12.4 In the case of motors supplied with unidirectional fans it is essential that the manufacturers state this fact in their tender. In such cases the direction of rotation for which the motor is arranged shall be clearly indicated by means of a permanent arrow on the non-driving end, preferably on the stator body and not on a removable end shield. A painted arrow only is not acceptable.

12.5 The shaft ends shall be provided with a suitably threaded hole or holes to facilitate the putting on of couplings etc.

13.0 MOTOR ATTACHMENTS

13.1 All motors shall be supplied and equipped with terminals and terminal boxes. Terminal box shall be positioned on the right hand side when looking at (facing) the driving end. For motors fitted with compound-filled sealing boxes the cable glands shall be designed to accommodate cables which rise from the floor.

13.2 Terminal boxes, including removable covers, may be made of steel for motors over 150 HP and shall be cast iron for less than 150 HP and totally enclosed. All cover joints shall be fitted with gaskets of polychloroprene or like material to prevent the ingress of moisture and

13.3 The boxes terminals, terminal leads and associated fittings shall be substantially designed and be able, when connected to an electrical system having a nominal short-circuit MVA capacity to be stated by the purchaser, to withstand conditions of internal fault without hazard to personnel in the immediate vicinity. Ability to withstand this fault for a clearance time of 0.25 seconds is required.

13.4 The terminal box shall be of sturdy construction and the means of fixing it or its component parts to the motor shall be so designed as to provide an enclosure in accordance with Section 5.

13.5 Ample space shall be provided for cabling and changing connections but the design must be such that it is impossible for small parts to be dropped into the interior of the motor.

13.6 Terminal boxes on TEFC motors unless of the explosion of type or increased safety (Exe) may be open to the interior of the machine.

13.7 Terminals

13.7.1 All terminals shall be substantially designed. Line terminals shall be thoroughly insulated from the frame with material resistant to tracking.

13.7.2 Natural rubber insulation shall not be used for terminal leads.

13.7.3 Means shall be provided to prevent accidental reduction of clearances at terminals.

13.7.4 Terminal markings shall be made in a clear and permanent manner.

13.7.5 Motors which are suitable for only one direction of rotation shall have this direction of rotation clearly indicated on the motor, together with the phase sequence of terminals associated with this rotation.

13.7.6 Studs shall be so fixed as to prevent their turning when nuts are tightened.

13.7.7 Adequate means shall be provided to prevent slackening of connections due to vibration. Connections having pinch screws bearing directly on the cable will not be acceptable.

13.8 Cable Entries

13.8.1 One cable entry shall be provided.

13.8.2 For all forms of cable connection it must be possible to remove the motor without breaking or stressing the seal or the cable.

13.8.3 Where PVC or rubber insulated and sheathed multicore cable is specified a compression gland of acceptable design may be proposed.

13.8.4 Cable glands, suitable for lead covered and armoured cable, shall be of the "stuffing" or similar type to avoid sweated or wiped joints unless otherwise specified.

13.9 Lifting lugs shall be provided for each motor weighing more than 50 Kg. All motors shall be equipped with a grounding bolt on motor frame and in each connection box.

13.10 All motors shall be equipped with a grounding bolt on motor frame and in each conduit box.

13.11 Corrosion-resistant screens or louvers shall be provided on high voltage motors.

14.0 FANS

14.1 Fans for motors should be of Brass, Bronze or Aluminium. Aluminium Alloy Fans should not contain more than 0.2% Copper, balanced before assembly on shaft.

14.2 Plastic, Fiberglass or other Non-Metalic fan housing are not acceptable.

15.0 BALANCING AND VIBRATION

15.1 Motors shall be dynamically balanced. The use of solder or similar deposits for balancing is not acceptable. Parent metal removal to achieve balance shall be carried out in such a way as not to affect the structural strength of the rotating element.

16.0 MISCELLANEOUS

16.1 Where solder is employed, it should have a melting poit of not less than 186°C.

16.2 Painting

16.2.1 Prepared surfaces shall free from rust, scale, sand, dust and grease before painting.

16.2.2 Finish shall be manufacturer's tropical standard in accordance with N.I.O.C, SP-80-2 Painting. For corrosive environments or areas subject to chemical spillage painting shall be per schedule (section 11) for such environments in SP-80-2.

17.0 TESTING

17.1 Minimum testing of motors shall include items (a) to (e) inclusive for each motor. Random complete tests including all items may exceptionally be requested by Purchaser, and also shall be required for one motor of each batch above 125 KW.

a. Measurement of no-load current.

b. Measurement to allow calculation of locked rotor current.

c. Measurement of winding resistance (hot and cold)

d. High voltage test plus insulation resistance immediately before and after test.

e. Inspection (at site) of bearings and mechanical operation of motor at no-load (full load for complete test).

f. Full load heat run.

g. Measurement to allow calculation of breakdown torque.

h. Measurement of locked rotor torque and determination of pull-up and breakdown torque including curve of complete speed-torque characteristic.

i. Determination of efficiency and power factor at ½, 3/4, full-load and, where applicable, at the service factor.

j. Measurement to allow calculation of power factor at full, three-quarter and half load.

k. Measurement of Vibration. Accepted values of peak to peak vibration amplitude for a motor, at rated voltage and speed on a machined surface bedplate with the motor unbolted and either a half key or coupling fitted, shall not exceed(.025 mm) for 2 pole and .05mm for 4 pole and above.

17.2 Certified test reports shall be provided for each motor.

17.3 All testing requiring voltage on the motor shall be carried out using full motor voltage.

17.4 For flameproof and Exe machines a prototype box with sealing chamber shall be tested under fault conditions to demonstrate that the box contains the explosion without emission of flame, and a test report shall be provided. Phase separated or phase segregated boxes shall be tested under internal single phase to earth fault conditions to demonstrate that they do not emit flame and that a fault is not propagated involving either of the other two phases. Phase insulated boxes shall be tested under conditions of internal 3 phase fault to demonstrate that they do not emit flame.

18.0 NAMEPLATE

18.1 Nameplates shall be of stainless steel, monel, brass or bronze. They shall be fixed to a non-removable part of the frame with the same material, and shall be according to manufacturer's standards.
Minimum information on the nameplate includes:

a. Maker's name.

b. Maker's frame size and serial number.

c. Voltage, phase, full load speed, frequency and full load current.

d. Class of rating:

1. Continuous
2. Short time

e. Class of insulation.

f. Type of connection-star or delta.

g. KW output at full power at tested temperature.

h. Efficiency and power factor at full load.

i. Type of enclosure e.g. TEFC, EXP, other.

j. Type and size of bearing.

k. Class of lubrication.

l. Maximum temperature rise.

m. Starting current at full load.

n. National Standard.

o. Tag No.

p. Starting torque % F.L.T.

q. Starting current % F.L.T.

r. Nett weight (If over 250 Kg).

The last 3 items are applicable only to motors over 12 HP.

18.2 When special features are embodied, a plate showing appropriate instruction shall be affixed to each motor.

18.3 Type of oil and instruction for sight oiler adjustment should be indicated on a separate data plate. Oil specified shall be B.P. Exxon or Shell, in accordance with NIOC Lubricating Oil Schedule.

19.0 INFORMATION TO BE SUPPLIED AT TIME OF QUOTATION

Information to be supplied by the manufacturer with tender for electric motors, shall be as follows:

1. Rated KW (a) maximum continuous rating or
   (b) short-time rating.
2. Line-line voltage.
3. Frequency
4. Number of poles.
5. Number of phases.
6. Direction of rotation if unidirectional.
7. Manufacturer's standards indication of:
   a) Make
   b) Type (mounting and enclosure)
   c) Frame size.
8. Applicable National Standard.
9. Maximum rated operating temperature.
10. Star or Delta wound.
11. Rated current at FL.
12. Starting torque, % FLC,
13. Starting current % FLC,
14. Min. run up torque, % FLT.
15. Stalling torque, % FLT.
16. Starting time, uncoupled at full voltage.
17. Efficiency and Power Factor at
    F.L.
    3/4 load
    ½ load
18. RPM at full load.
19. Class of insulation.
20. Maximum temperature rise by the thermometer and/or resistance.

21. Guaranteed minimum air gap.
22. Bearings (a) Type
    (b) Make and size
    (c) Method of lubrication.
23. Terminal box arrangement and cable gland details.
24. Heaters supply voltage.
25. Coupling or pulley details where supplied.
26. Approximate weight.
27. Recommended spare parts list, for 2 years operation.
28. Recommended commisioning spares.

20.0 SPARE PARTS SUPPLIED

Spare parts shall be interchangeable as far as possible between motors and be suitable for use in place of the original parts fitted and comply with the same specification and tests. They shall be marked and numbered for easy identification, and preserved to prevent deterioration during transport and/or storage in a damp or humid, tropical atmosphere.

21.0 ADDITIONAL REQUIREMENTS FOR MOTORS FOR USE IN DIVISION 2 AREAS

21.1 Scope

In addition to the general requirements as already specified requirements of increased safety for motors in division II areas should be considered upon purchaser request. In cases wher industrial T.E.F.C. motors are offered instead of increased safety motors, in addition to the requirement the following requirements and modifications should also be followed.

These requirements apply to motors rated for 1 KW per 16.7 rev/s or greater.

21.2 Terminal Arrangement

21.2.1 Terminal Box Assemblies

Terminal box assemblies shall, when connected to an electrical system having a nominal short circuit MVA capacity equivalent to that specified by the Purchaser, withstand the effects of (a) through faults and (b) internal faults in uncompounded compartments, without disintegration of the outer enclosure and without emission of flame which could be injurious to personnel in the vicinity of the motor. Type test requirements are detailed in sub-clauses (b) and (c).

21.2 Cont'd

21.2.2 Type Test for Terminal Box Assemblies for use with Motors at 380 volts and lower

Type test are not required for terminal box assemblies used with motors provided in service with protective equipment which under conditions of short circuit is energy limiting, e.g. HBC fuses.

When motors are not provided at site with protective equipment which under conditions of shor circuit is energy limiting, e.g. conventional circuit breakers, then the terminal boxes used with such motors shall be type tested in accordance with the requirements of clause (c), Catogory B.

21.2.3 Type Tests for Terminal Box Assemblies for use with Motors above 380 volts

Terminal box assemblies shall be type tested to demonstrate their ability to withstand (a) through faults and (b) internal faults in uncompounded compartments without disintegration of the outer enclosure and without emission of flame which would be injurious to personnel in the vicinity of the motor.

21.2.4 The terminal box assemblies used for type tests shall be identical with those to be used in service in all details likely to affect their performance during individual type tests, and for the purpose of the tests shall be mounted in a manner representative of service.

21.3 Type Tests are of two categories:

21.3.1 Category A- Applicable to terminal box assemblies for use with motors provided in service with protective devices which under conditions of short circuit are energy limiting, e.g. HBC fuses.

Category B- Applicable to terminal box assemblies for use with motors provided in service with protective devices which under conditions of short circuit are not energy limiting e.g. conventional circuit breakers.

Type tests shall be made with the terminal ... assemblies connected to an electrical syst... having a nominal short circuit MVA capacity ... less than that specified by the Purchaser.

21.3.2 Category A Type Test- The supply to the termi... al box assembly shall include protective devices identical to or possessing the sa... fault energy limiting characteristics as the protective devices specified by the Purchaser.

Category B Type Tests - The supply to the termi... nal box assembly shall include a circuit breaker arranged to disconnect the supply 0.25 seconds after it has been energised.

21.3.3 The terminal box assemblies shall be tested under conditions of:

I) Theree phase through fault, followed by

II) a three phase internal fault in the terminal compartment for phase insulated types or a single phase to earth fault for phase separated or phase segregated boxes.

21.3.4 The terminal box shall be deemed to have failed if:

a) There is disintegration of the outer enclosure or the emission of flame which would be injurious to personnel adjacent to the motor.

NOTE: Where terminal boxes include devices to control emitted flame resulting from internal faults, then the point and direction of such devices shall be subject to agreement with Purchase...

b) On the through fault test any fault on the outgoing side of the assembly is transferred to the interior of the assembly.

c) Any single phase to earth fault on a phase segregated or phase separated box develops into a phase - to - phase fault.

21.3.5 Certificates of type tests shall be considered as evidence of the compliance of terminals box assemblies with the requirements of the relevant clauses of this specification, and the manufacturer shall hold available such certificates, together with detailed drawings of the terminal box assemblies and a record of any alterations that have been made in them subsequent to the tests.

21.4 Stator Windings

21.4.1 General

Insulation materials should be approved and comply individually with latest referenced standards.

21.5 Air Gap

Taking into consideration all causes of eccentric positioning of the rotor in the stator bore (bearing clearances clearances between bearing bracket spigots, deflection of shaft due to rotor weight and loading external to the shaft), and the deflection of the shaft due to the unbalanced magnetic pull resulting from this eccentricity, allowing for the permissible reduction of the nominal gap to 90% of the calculated value, the final minimum radial air gap for ball and for roller bearing motors shall be not less than 0.2mm and for sleeve bearings not less than 0.3mm. The manufacturer shall upon request by the Purchaser, make available calculations establishing these limits.

21.6 Squirrel Cage Windings

21.6.1 Rotor Cage Built from Conductors Brazed to End Rings

Adequate means should be provided to eliminate the risk of sparking during starting and running.

21.6.2 Cast Rotor Cages

The soundness of cast rotor cages shall be established, the method of test being the subject of agreement between the manufacturer and the purchaser.

21.7 Ball & Roller Bearings

The calculated life (ISO B-10 "90% survival" under the estimated bearing loads) should comply with the following requirement:

UP to 75 KW	15,000 hrs.
75 KW to 250 KW	25,000 hrs.
250 KW & over	50,000 hrs.

22.0 DRAWINGS

Vendor shall submit the following drawings at agreed times after placing of the purchase order:

Installation
Outline diagram
Connection diagram

23.0 PREPARATION FOR SHIPMENT

23.1 Electric motors shall be shipped with bearings lubricated.

23.2 Silica gel or similar dehydrating compound shall be enclosed in each motor package. Vents shall be waterproof sealed. (5)

23.3 Preparation for shipment shall be in accordance with Manufacturer's standards, unless otherwise noted on the Request for Quotation and/or Purchase Order. The Manufacturer shall be solely responsible for the adequacy of the preparation for shipment employed with respect to materials and application, and provide materials to their destination in ex-works condition when handled by commercial carrier systems.

23.4 Rotors shall be locked. (5)

24.0 DATA SHEETS

Attached data sheets should be completed by supplier and be submitted with quotations, as relevant.

1– الکتروموتور پیشنهادی باید از برند های Siemens , ABB **و** LOHER **و** Schorch **باشد.**

2- **الکتروموتور و تجهیزات جانبی مورد استفاده بایستی متناسب بانوع حفاظت محفظه و دارای گواهی نامه معتبر باشند والکتروموتورها باید مطابق استاندارد** IEC-60079/ 60034 **ساخته شده و منطبق بر** IPS **و شرایط اعلامی در** SP-2260-60-002-1 **باشند.**

3– **انجام کلیه روتین تست های اشاره شده در استاندارد** IEC60034 **در کارگاه تامین کننده و یا شرکت ثالث مورد تائید نماینده کارفرما و تحت نظارت نماینده کارفرما الزامی است و هماهنگی با شرکت ثالث بر عهده پیمانکار میباشد.**

4-**کلیه هزینه های مربوط به روتین تست های مورد نیاز بر عهده پیمانکار می باشد.**

5-**از آنجا که الکتروموتورهای این قرارداد جایگزین الکتروموتورهای مشابه موجود خواهند شد لذا سایز فریم، قطر شفت و نشیمنگاه الکتروموتورهای پیشنهادی باید با الکتروموتور موجود مطابقت داشته باشند . هرگونه عدم تطابق در الکتروموتورهای پیشنهادی با این موضوع باید با ذکر علتبه صورت شفاف اعلام گردد تا از سوی خریدار بررسی گردد.**

6– **جهت گردش کلیه الکتروموتورها دو جهته مورد نیاز می باشد.**

7– **سازنده موظف می باشد کتابچه** Installation, operation and maintenance Instruction **الکتروموتورهای این قرارداد را به زبان انگلیسی به همراه نقشه ابعادی، دیتاشیت کامل، نیروهای وارد بر فونداسیون، جزئیات تجهیزات جانبی، دیاگرام ترمینال ها و سیم کشی، گواهینامه های صادره از سوی** N.B **و گزارش** FAT **را تحویل دهد.**

8– **گواهینامه های** ATEX/ IECEX **ارائه شده می بایست قابل پیگیری از مرجع اصلی صادر کننده گواهینامه بوده و این موضوع باید به رویت و تایید نماینده خریدار برسد. همچنین اخذ تائیدیه انجمن نفت ایران جهت گواهینامه های ارائه شده الزامی است.**

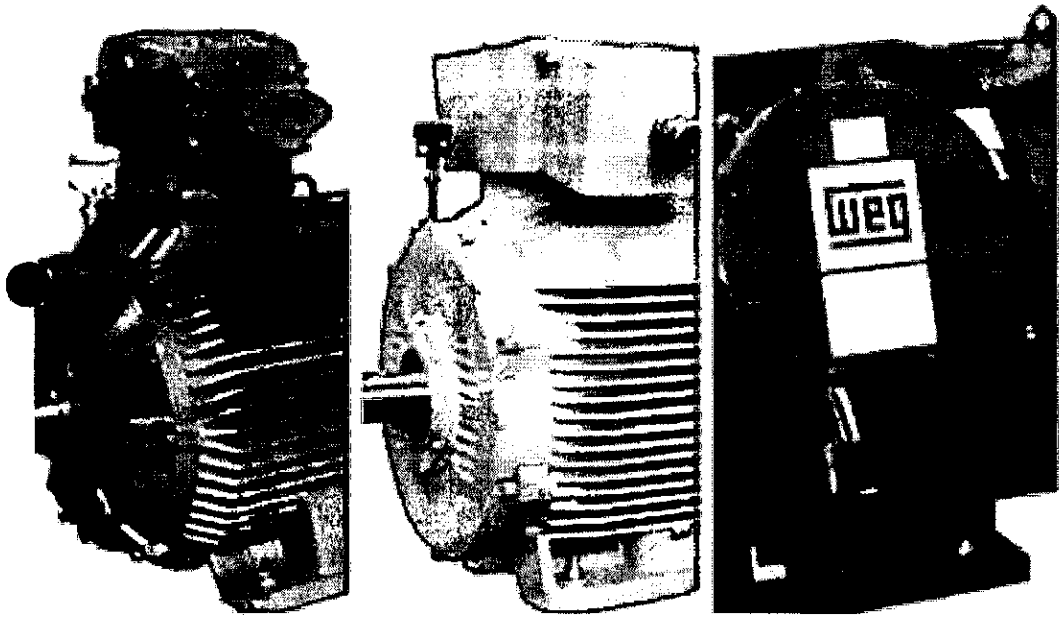
9– **تامین کننده موظف می باشد انحرافات احتمالی از کلیه مشخصات مورد تقاضا را در پیشنهاد فنی را به صورت واضح اعلام نماید.**

10– **در صورت عدم ارائه گواهینامه** type examination certificate (Directive 2014/34/EU) EU **پرداختی بابت الکتروموتور مذکور صورت نخواهد پذیرفت.**

Hazardous Areas Motors

Manual de Instruções
Instructions Manual
Instructions de Service

- BFG(C)8 400
- BFG(C)8 450
- W22XB(C) 355
- W22XB(C) 500



Ref. 110.11 - Rev 03
06/2009

Instructions Manual

Asynchronous Three-Phase Flameproof Motors

1. PRELIMINARY NOTES

1.1 Thank you for showing a preference to use WEGeuro motors. To enable you to get the optimum performance from your motor it is recommended that the following instructions are observed, giving special attention to the points with the mark Ⓔx which are specially important for motors installed in Hazardous Areas

Ⓔx 1.2 All the Installation and Maintenance operations shall be made by trained persons duly qualified to make interventions in this type of motors and they must be familiarized with the requirements and safety rules in force, in particular with the concept of protection.

Ⓔx 1.3 To reduce to the minimum the risks of ignition due to the electric material in dangerous areas, effective inspection and maintenance of the material must be assured.

Ⓔx 1.4 WEG motors are designed to be installed, put into service and used in accordance with the characteristics included in this Instructions manual. The following instructions must be read jointly with the standards :

- EN 60079-14 2003
- EN 60079-17 2003
- EN 60079-19 2007
- EN 61241-14 2004
- EN 61241-17 2005
- IEC 60079-14 2002
- IEC 60079-17 2002
- IEC 60079-19 2006
- IEC 61241-14 2004
- IEC 61241-17 2005

The non-respect of these instructions could not engage our responsibility

Ⓔx 1.5 Our equipment is CE marked according to ATEX 94/9/CE directive. They are designed to be used in explosive atmospheres - category 2 G, 2GD or M2 - zones 1 and 2; 21 and 22.

Ⓔx 1.6 The user must ensure himself of compatibility between the nameplate indications and the surrounding hazardous atmosphere present, the classified zone of use and the surface and ambient temperatures.

Ⓔx 1.7 The WEGeuro Flameproof Motors in its standard execution are supplied with flameproof terminal boxes **Ex d**. As optional can be supplied with Increase Safety terminal boxes **Ex e**. In this case the description code for the motor protection is **Ex de**

1.8 **Ex d** motors are manufactured according to the European Standards EN 60079-0: 2006, IEC 60079-0: 2004 and EN 60079-1: 2004, IEC 60079-1: 2001. **Ex de** motors are according to the same standards and EN 60079-7: 2003, IEC 60079-7: 2001. The gas group is **IIB** or **IIC** or **I** depending on motor type. See CE declaration.

1.9 Flameproof joints of WEGeuro motors can have values more restricted than the minimum values indicated in the standard. The authorized repair shops must contact us everytime they need detailed information concerning flameproof joints values.

1.10 Motors with IP65 or IP66 protection degree, designed to be used on combustible dust environments (Ex tD A21 IP6X T125°C/T135°C), are additionally in accordance with EN 61241-0: 2006, IEC 61241-0: 2004 and EN 61241-1: 2004, IEC 61241-1: 2004. See CE declaration.

2. GENERAL INSPECTION

2.1 Check if the motor characteristics indicated on the nameplate are in accordance with those specified in the order.
In case of non-compliance please contact our nearest Sales Office or the Factory.

2.2 These motors have been designed to work in atmospheres that present a risk of explosion. It is therefore indispensable to carry out a very careful inspection of the material received, as well as the external parts of the motor (frame, endshields, terminal box and terminal box lid).

2.3 Any fault found has to be marked and analysed in order to ensure that the motors may function without any risk in this atmosphere. If necessary, the damaged parts or the parts that could present a risk in the future should be replaced.

3. TRANSPORT AND STORAGE

3.1 Should the motors need to be transported to another destination, care must be taken to prevent the motors being exposed to harmful effects.
All motors equipped with roller bearings and the motors frame size 250 and above equipped with angular contact ball bearings are fitted with a device to lock the rotor during transport generally fitted on drive end. Some motors may have two locking devices one on the drive end and other at the non-drive end. This device should only be removed when the motor is ready for mounting.

3.2 The motors should be stored in a clean, dry and vibration free place.

3.3 Machined surfaces - shaft end, flange, etc - are protected with anti rust coating (ANTICORIT BW 366 from FUCHS or equivalent).

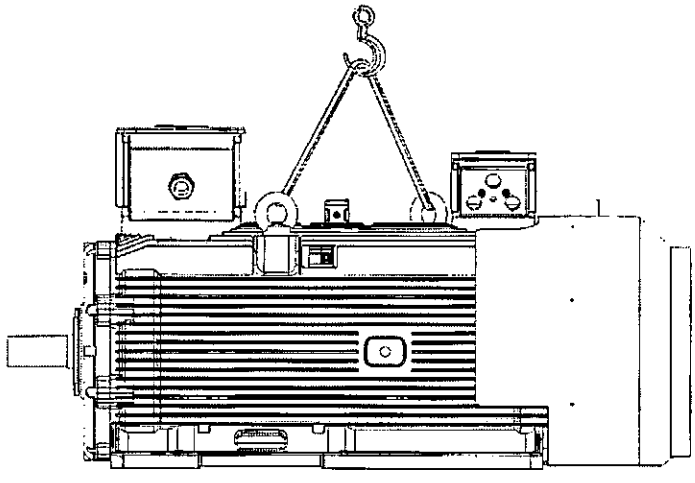
If motors are to be stored for a long period of time, these surfaces should be checked and "touched up" if necessary.

3.4 Flameproof joints are protected with anti rust coating (MOBILPOLYREX or other equivalent recommended by WEGeuro). These surfaces shall be periodically checked and a "touched up" or a new protection coat shall be applied if necessary, mainly on terminal box joints if they are already opened.

3.5 For long storage periods is recommended that the rotor shafts should be turned periodically to prevent bearings deterioration.

3.6 If motors are fitted with anti-condensation heaters, these should be connected during storage.

3.7 The lifting of the motor shall be made by using the eyebolts as shown in the picture:



4. INSTALLATION

4.1 The rotors of the motors are dynamically balanced with **half key**. For this reason the coupling to be fitted to the motor shaft end also has to be balanced with **half key**, according to the standard IEC 60034-14. When requested specifically the rotors could be balanced with full key.

4.2 To fit the coupling on the shaft end extension, the coupling should be heated up to approximately 80°C.
If necessary, this assembly operation can be aided by means of a screw in the threaded hole of the shaft end.

Note – Never assemble the coupling by hitting, as it could cause serious damage to bearings.

4.3 In the case of direct coupling the motor and the driven machine shall be aligned according to the parallel and angular alignment values established by the coupling manufacturer, not forgetting that the more precise the alignment, the longer will be the life of the bearings.

In the case of belt drive transmissions they must be static conductive, flame resistant and self-extinguishing. The pulleys should neither be too narrow or wider than the width of the shaft end. The tension of the pulleys should also be taken into account; it should not be higher than the values of radial loads recommended for bearings. If these specifications are not followed, there is a serious risk of collapse of the bearings or even the shaft.

Ex 4.4 Unless different engraved on nameplate, these motors are prepared to work on ambient temperatures from -20°C up to +40°C.

For temperatures out of this range the factory shall be contacted, to analyse if a special execution and/or certification is required.

Ex 4.5 In motor installation take care to ensure a free circulation of fresh cooling air is guaranteed.

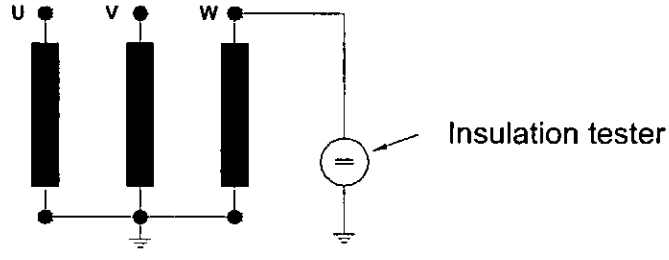
4.6 If the motor is mounted on vertical position shaft down, a protection canopy shall be fitted on fan cowl to avoid the ingress of water or solid objects through the fan grid protection.

5. START UP

5.1 If the motors have been out of service or stored for a long period of time, it is recommended that the winding resistance is measured before installation and start up.
The insulation resistance should be measured using equipment rated for 500 VDC for motor voltages up to 1,1kV, and equipment rated for 1000 VDC for motor voltages between 1,1 kV and 11 kV.

These measurements should be made before connecting the supply cables.

A possible diagram to measure the insulation resistance for complete winding is showed below. The measure must be taken 1 minute after apply the DC voltage with the insulation tester.



According standard IEEE 43-2000 the recommended minimum insulation resistance values at 40°C in MΩ are the following:

- 5 MΩ, for low voltage motors ($U \leq 1,1kV$)
- 100 MΩ, for medium voltage motors ($1,1kV < U \leq 11kV$)

Insulation resistance depends mainly from the winding temperature as showed in the following table:

WINDING TEMPERATURE	VOLTAGE SERVICE ≤ 1,1KV	> 1,1KV
20° C	20 MΩ	400 MΩ
30° C	10 MΩ	200 MΩ
40° C	5 MΩ	100 MΩ

Should the insulation resistance values be lower than the above, check if the terminals are affected by humidity or dust and clean them as necessary.
In the event of this not being the case the motors will need to be oven dried at a temperature less than 100 ° C degrees.

5.2 Ensure that the motor nameplate voltage is the same as the mains supply. The connection diagrams supplied inside the motor terminal box shall be always respected in function of available supply voltage and/or required speeds (2 speed motors).
For information, the most common connection diagrams are indicated on pages 35/36.

5.3 All motors are supplied clockwise rotation, viewed from shaft end, when the alphabetical sequence of the terminal letters (U,V,W), corresponds with the time sequence or the phases (L1,L2,L3). To change the rotation of direction of the motor it is necessary to exchange 2 of the 3 supply cables.
Motors having unidirectional fan, have assembled an arrow label to indicate the direction of rotation of the motor.

Ex 5.4 If motors are fitted with **Ex e** terminal boxes with bushing insulators, shunts must be assembled or disassembled as indicated in the instructions given in this manual, in order to avoid that position of connecting clamps is modified (see page 37).

Ex 5.5 Close to each threaded hole in enclosures foreseen for conduit entries it has a plate with it dimensions and thread type.

Ex 5.6 Cables and cable-glands used must be compatible with the temperature indicated in the certificate plate whenever it's higher than 80°C:
- 100°C for ambient temperature 60°C
- 90°C for ambient temperature 50°C

Ex 5.7 Cable glands must be **ATEX certified for motores ATEX and IECEx in case of motors with certification IECEx** and must have the same protection (Ex d IIB, Ex d IIC, Ex e II, Ex d I or Ex e I) of the terminal boxes.

Ex 5.8 Before closing terminal boxes make sure that they are completely free from dust inside.

5.9 Before the motor start-up, the supply connection shall be checked if they have been made according to the diagrams of this manual or supplied inside terminal box, taking in consideration the type of motor and winding.

5.10 Unused cable entries of main terminal box, auxiliary terminal box and bearing thermal protections, **must be closed with ATEX / IECEx certified threaded plugs** with the same protection (Ex d IIB, Ex d IIC, Ex e II, Ex d I or Ex e I) of the terminal boxes.

5.11 Motors with flying leads must be connected out of hazardous area or with an approved protection way or system.

5.12 Motors fitted with angular contact ball bearings should not be allowed to run at no load and must be used in the mounting form IM engraved on the nameplate. (see **IM** in the nameplate).

5.13 Motors with sleeve bearings (not foreseen for IIC group) must be directly coupled to the driven machine. The pulley/belt drive system is not recommended for this type of motor.
When the motor is coupled to the driven machine take care to the axial float of the motor sleeve bearing, of driven machine as well as the maximum axial tolerance of the coupling.
This type of motors are not allowed in any circumstances to work with axial thrusts on the sleeve bearings as they are not designed to support this kind of loads.

6. MOTOR PROTECTIONS

6.1 We recommend motor protection by using overloads and short-circuit relays.

6.2 Motors must be earthed, using either the earting screw inside the terminal box or fixed to the motor frame.

6.3 If motors are fitted with thermal protections, **they must be connected** in order to guarantee that maximum allowable surface temperature of the motor is not exceeded.
In case of Pt100 or thermocouples, tripping temperature must be regulated to the values indicated by WEGeuro.

Particularly motors supplied via Variable Speed Drive must be fitted with thermal sensors on windings and, eventually, on one of the bearings. The connections of these thermal protections **are compulsory**. These motors are equipped with flameproof terminal boxes Ex d only.

On 2 speed motors both windings shall be individually protected.

6.4 If anti-condensation heaters are fitted, they can not be connected unless the motor is switched off and cold.

6.5 In the case of motors with forced ventilation or without a fan working in an air flow, a device must avoid motor running without ventilation.

To avoid that maximum allowed surface temperature is exceeded, thermal protectors of main and auxiliary motors must be connected to suitable protection devices and, if protectors are Pt100 or thermocouples, trip temperatures must be regulated to the values indicated by WEGeuro.

7. MAINTENANCE

7.1 The motors which are not fitted with grease nipples are equipped with bearings with lubrication for life that is 20.000 working hours under normal conditions.
The type, quantities of grease and the respective lubrication intervals for normal working conditions are shown on the nameplate. The addition of grease should be carried out with the motor running and in compliance with safety procedures.
For heavy working conditions, such as high levels of humidity and pollution, excessive loads on the bearings, excessive levels of vibration, the grease lubrication intervals should be reduced.

7.2 Every two years the motors should be opened and the bearings should be checked, and replaced, if necessary.
For heavy working conditions this interval should be shortened.

7.3 The air inlets and the cooling surfaces shall be cleaned periodically. The intervals depend on the degree of pollution/accumulation of dust in the air.

Ex 7.4 *The maintenance of flameproof motors is particularly important, as:*

- *Any changing to the bearings could:*
  - *cause a sudden temperature rise, thus presenting a risk of explosion*
  - *increase the clearance between the shaft and the bearing plate, due to friction of the shaft on the closing plate; an internal ignition may spread to the outside and can cause an explosion*
- *Concerning external ventilation, a fault in the cooling system raises the surface temperature, which could reach values higher than those established for the temperature class.*
- *The temperature class should be checked on the certification plate; this indicates the maximum temperature as follows:*

T3 / 200°C ; T4 / 135°C ; T5 / 100°C ; T6 / 85°C

8. ASSEMBLING AND DISASSEMBLING

Ex This type of motors requires a special care. Particularly when assembling and disassembling parts are carried out, the condition of the joints should be checked. The dimensions of the joints, i.e. length and clearance, have been 100% controlled during production of the motors. The joints must not be changed and you need to:

- Ensure that the joints are not damaged and do not have cuts or dents.
  If this happens the parts should be replaced.

- All the screws should be well tightened. A screw which is not tight enough changes the resistance of the enclosure. In case of replacement of a screw, it is imperative to keep its length and quality of material.
- Do not change interchangeable parts during maintenance.

The motor and terminal boxes enclosures must be fitted with screws of resistance class not less than 12.9.

9. MARKING

9.1 All motors have two marking plates:

- ***Nameplate***

This nameplate contains information in compliance with the IEC 60034-1, as well as other useful technical information.

Note – The two first digits of the serial number indicate the manufacturing year of the motor.

- ***Certification plate***

The certification plate must be in accordance with the explosive atmosphere where the equipment will be used or in accordance with the certification type, ATEX or IECEx and it may contain the following information:

- For explosive atmospheres with gas :

ATEX marking	IECEx marking
 **II 2 G**	
Ex d IIB (or **C**) **T4** or **Ex de IIC** (or **B**) **T4**	**Ex d IIB** (or **C**) **T4** or **Ex de IIC** (or **B**) **T4**

	European symbol for "Ex" products
II	Group of material designed for places with potentially explosive atmospheres, other than mines susceptible to firedamp
2	Area where an explosive atmosphere, is likely to occur in case of abnormal working conditions of the installation
G	Explosive atmospheres with gas
Ex	Symbol which indicates that the material complies with one or several of the protection modes in accordance with European standards
d	Enclosure with flameproof protection
e	Component with increased safety protection
B	Subdivision of group II
C	Subdivision of group II
T4	Temperature class

- For explosive atmospheres with gas and/or dust :

ATEX marking	IECEx marking
 **II 2 GD**	

Ex d IIB (or C) T4 Ex tD A21 IP6X T125°C or **T135°C**
or
Ex de IIC (or B) T4 Ex tD A21 IP6X T125°C or **T135°C**

	European symbol for "Ex" products
II	Group of material designed for places with potentially explosive atmospheres, other than mines susceptible to firedamp
2	Area where an explosive atmosphere, is likely to occur in case of abnormal working conditions of the installation
GD	Explosive atmospheres with gas and/or dust
Ex	Symbol which indicates that the material complies with one or several of the protection modes in accordance with European standards
d	Enclosure with flameproof protection
e	Component with increased safety protection
B	Subdivision of group II
C	Subdivision of group II
T4	Temperature class
tD	Protection by enclosure
A21	Under procedure A for zone 21
IP6X	Ingress protection
T125°C/T135°C	Maximum surface temperature

- For underground parts of mines :

ATEX marking	IECEx marking
 **I M 2**	
Ex d I or **Ex de I**	**Ex d I** or **Ex de I**

	European symbol for "Ex" products
I	Group of Equipment intend for use in underground parts of mines, and to those parts of surface installations of mines, liable to be endangered by firedamp and/or combustible dust
M2	Category of equipment ensuring a high level of protection and intended to be de-energized in the event of an explosive atmosphere being present
Ex	Symbol which indicates that the material complies with one or

	several of the protection modes in accordance with European standards
d	Enclosure with flameproof protection
e	Component with increased safety protection

- Certificate number

ATEX	IECEx
INERIS 07 ATEX 0062X	**IECEx INE 08. 0013X**

INERIS	**INE**	The name of the notified body
07	**08**	Year of Certification
ATEX		Designation of the Directive 94/9/CE (explosive atmospheres)
0062	**0013**	Certificate number
X	**X**	Special conditions for use

- ***Connection cable must be compatible with a temperature of __°C***

- **WEGeuro INDÚSTRIA ELÉCTRICA, S.A.**
  Rua Engº Frederico Ulrich, Sector V
  Apartado 6074
  4476-908 Maia - Portugal

9.2 Complementary marking

The cover of the terminal box contains the following information:

- ***WARNING:***

- ***DO NOT OPEN WHEN OPERATING***
- ***DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT***

Supplementary information: Addresses of the Commercial Branches WEG are enclosed.

10. SPARE PARTS

To order a spare part it is necessary to indicate:

Motor Type
Motor Serial Number
Designation of the spare part.

The motor type and serial number are stamped on the nameplate.

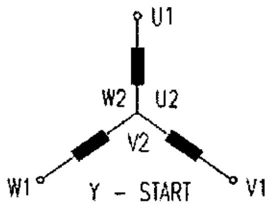
11. DECLARATION OF CONFORMITY

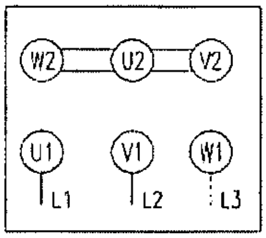
The Declarations of Conformity are supplied with motors. In the cases where the motor or terminal box certificate number have the suffix "X" is also included a special conditions for use for which special attention must be given to be respected on use.

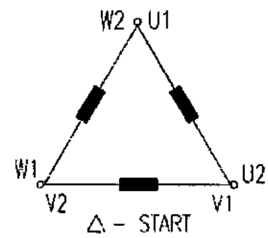
****

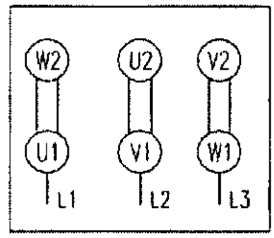
ESQUEMA DE LIGAÇÕES / COMMON CONNECTION DIAGRAMS / SCHÉMAS DE RACCORDEMENT PLUS COMMUNS

ARRANQUE DIRECTO / DEMARRAGE DIRECT / DIREKT ANLAUF / D.O.L. STARTING

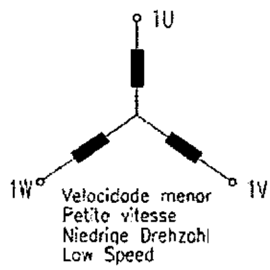


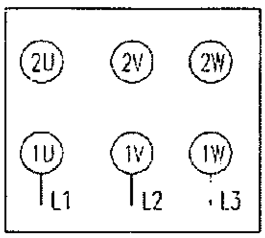


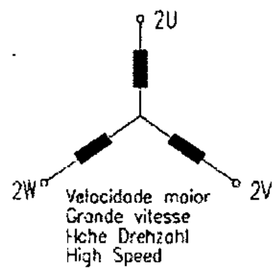


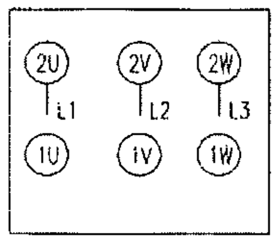


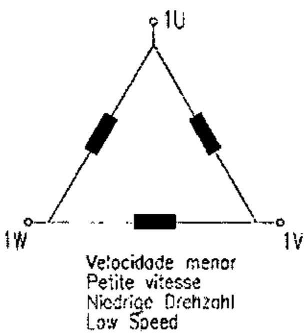
MOTORES 2 ENROLAMENTOS / MOTEUR A POLES COMMUTABLES / POLUMSCHALTBAR / POLE-CHANGIG WINDING

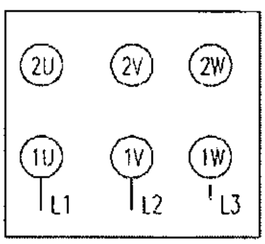


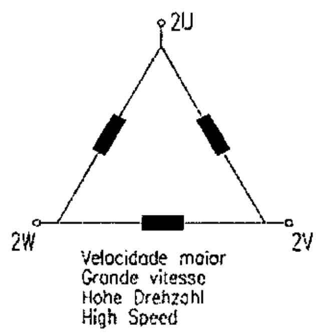


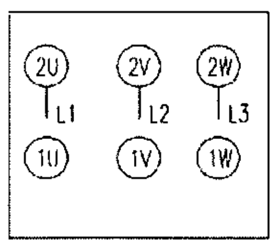


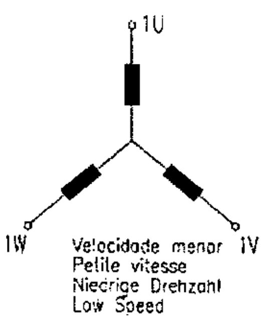


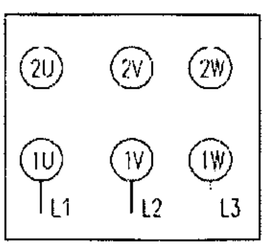


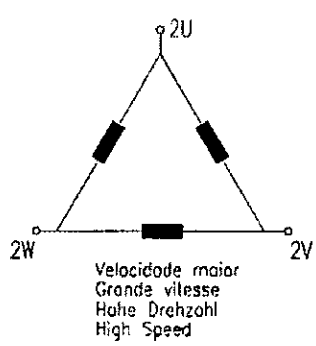


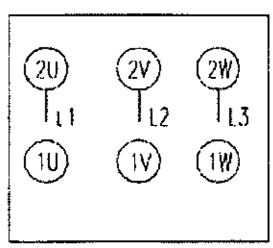






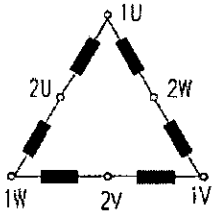




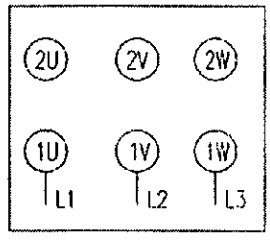


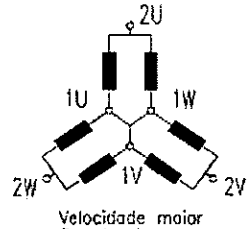
ESQUEMA DE LIGAÇÕES / COMMON CONNECTION DIAGRAMS / SCHÉMAS DE RACCORDEMENT PLUS COMMUNS

LIGAÇÃO DAHLANDER / COUPLAGE DAHLANDER / DAHLANDER SCHALTUNG / POLE CHANGING WINDING (DAHLANDER)

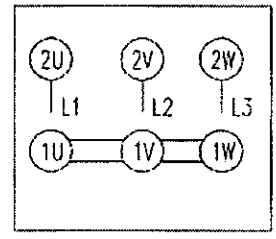


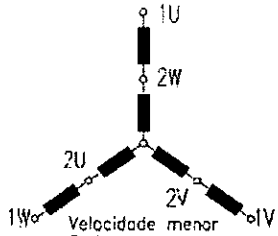
Velocidade menor
Petite vitesse
Niedrige Drehzahl
Low Speed



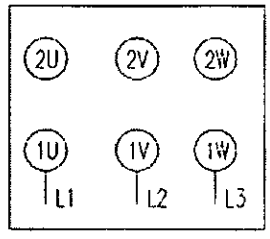


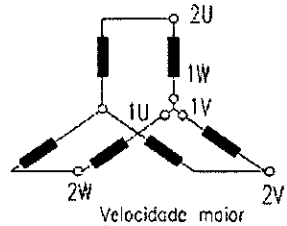
Velocidade maior
Grande vitesse
Hohe Drehzahl
High Speed



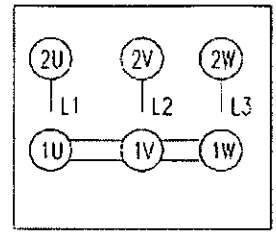


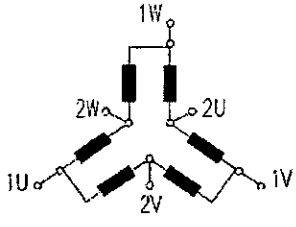
Velocidade menor
Petite vitesse
Niedrige Drehzahl
Low Speed

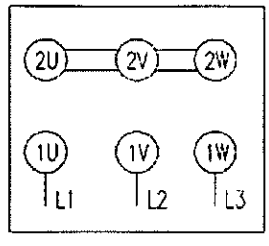


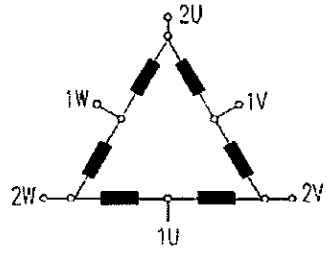


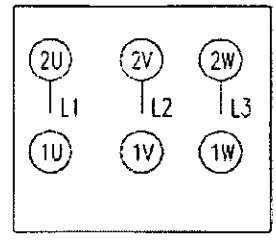
Velocidade maior
Grande vitesse
Hohe Drehzahl
High Speed



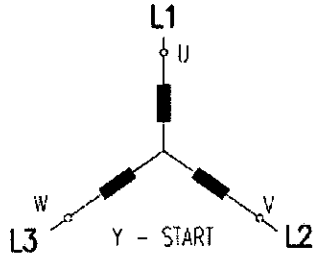


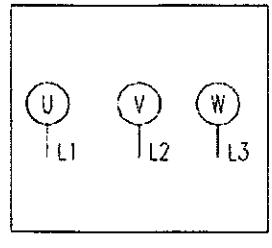






MÉDIA TENSÃO / MEDIUM TENSION / MITTELSPANNUNG / MEDIUM VOLTAGE





WEG Euro - Indústria Eléctrica, S.A.

Ligação de Motores EExde

Connection of EExde Motors

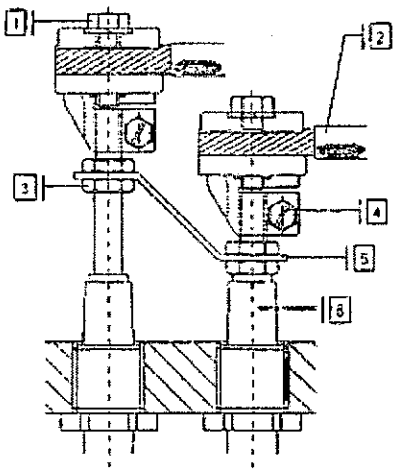


Fig. A

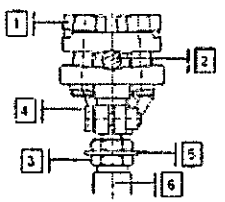


Fig. B

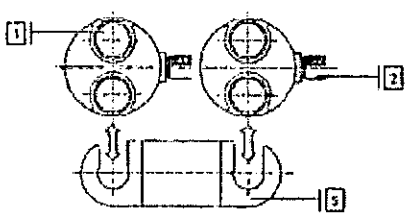


Fig. C

- ✓ Seleccionar cabos de ligação com secção adequada ao serra-cabos (ver indicação no serra-cabos);
- ✓ Desapertar os parafusos [1] para fixar os cabos de ligação [2] no serra-cabos. Apertar novamente os parafusos [1];
- ✓ Para remover as pontes de ligação [5], desapertar as porcas [3] e retirar as pontes lateralmente (ver fig. C). Apertar novamente as porcas [3].

- ✓ Select connection cables with a section compatible with the clamps (see indication in top of clamps);
- ✓ Loosen the screws [1] to connect the cables [2] in the clamps. Then, leave the screws [1] well tight;
- ✓ To remove the shunts [5], loosen the nuts [3] and remove the shunts laterally (see fig. C). Tight the nuts [3] again.

NUNCA DESAPERTAR OS PARAFUSOS DE IMOBILIZAÇÃO DO SERRA-CABOS [4]!
NEVER UNSCREW CLAMP IMMOBILIZATION SCREWS [4]!

1 - Parafuso de aperto do serra-cabos / Clamp screw
2 - Cabo de ligação / Connection cable
3 - Porca de fixação da ponte de ligação / Shunt fixing nut
4 - Parafuso de imobilização do serra-cabos / Clamp immobilization screw
5 - Ponte de ligação / Shunt
6 – Isolador / Bushing Insulator

IMPRESSCXPOTEXE0

www.weg.net

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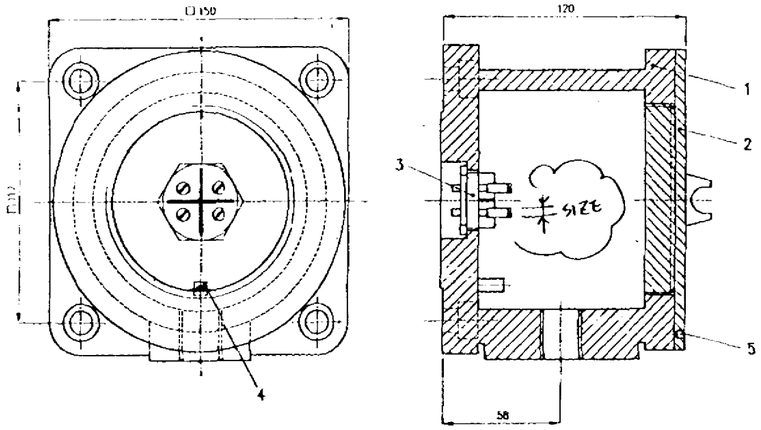
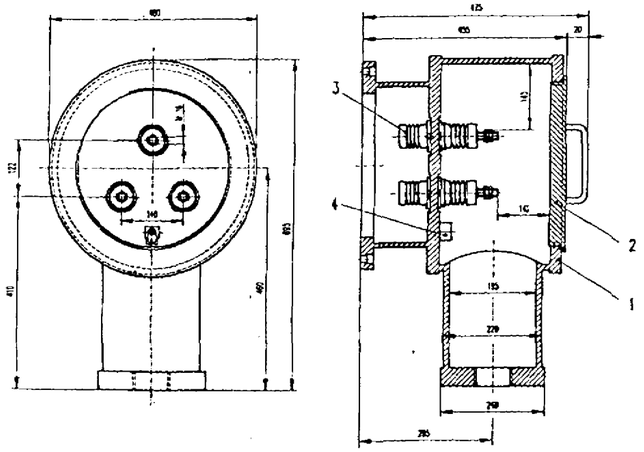
Ref 110.11 Rev 03 06/2009



DESCRIPTION

1 BOX
2 COVER
3 TERMINAL BLOCK
4 EARTHING CLAMP
5 SCREW

DETAIL *1
HEATERS TERMINAL BOX



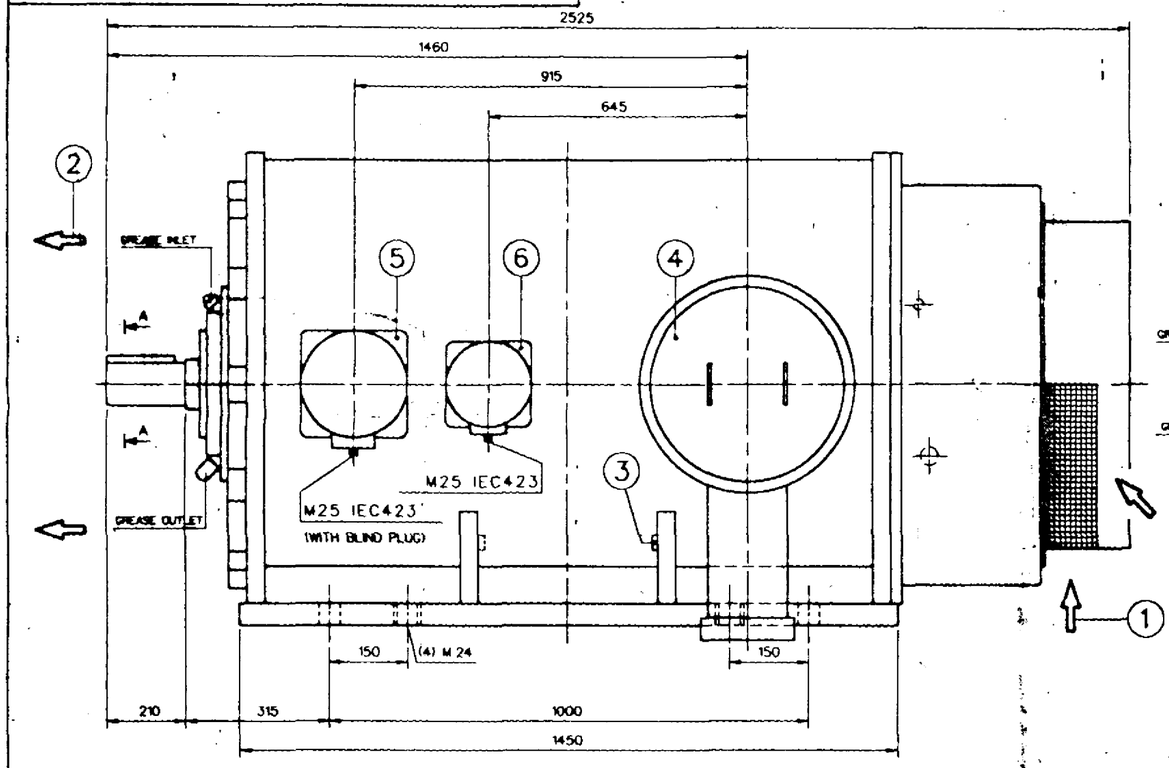
DESCRIPTION

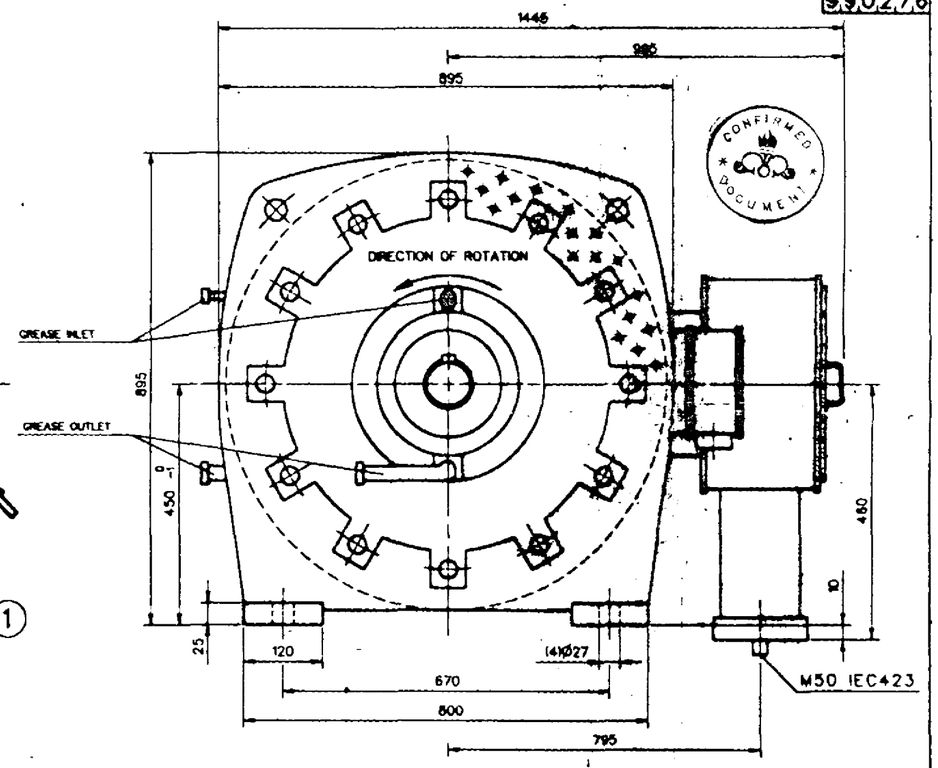
1 BOX
2 COVER
3 INSULATOR
4 EARTHING CLAMP

DETAIL *2
MAIN TERMINAL BOX

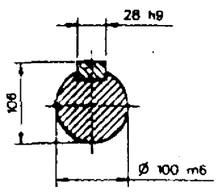
STATO DELLE SUPERFICI SECONDO TR F 2943 / UNI 4990

NUMERO 9.9.0.2.7.6





"A-A"



CHARACTERISTIC DATA

ITEM	FA-101-A-M/B-M
RATING	400 kW
VOLTAGE	6000 +/- 5% V
FREQUENCY	50 +2/-5% Hz
SPEED	1481 rev/min
MOUNTING	IM83
PROTECTION DEGREE	IP55
TYPE OF COSTRUCTION	EEx-d-IIB-T3
MOTOR WEIGHT	2880 kg
ROTOR WEIGHT	500 kg
4WR²	45 kg m2
ROLLING BEARING D.E.	NU322c3
ROLLING BEARING N.D.E.	6322c3

LOADS ON EACH SIDE REST

DEAD LOAD	14.13 kN
NORMAL ELECTROMAGNETIC REACTION	3.85 kN
SHORT-CIRCUIT ELECTROMAGNETIC REACTION	± 38.53 kN

MOTOR IS SUITABLE TO RUN IN ONE DIRECTION OF ROTATION ONLY
N. MOTOR CESI CERTIFICATE AD- 84.091 X

DESCRIPTION

1 AIR INLET
2 AIR OUTLET
3 EARTHING CLAMP
4 MAIN TERMINAL BOX (SEE DETAIL *2)
5 RTD'S TERMINAL BOX (6 PT100)
6 HEATERS TERMINAL BOX (520 W - 230 V) (SEE DETAIL *1)

INDICE	MODIFICHE	DATA	VISTO	FIRME	DATA	PESO
A	UPDATED CABLE INLET	07.05.91	CL	DISEGNATO COLALIGI	28.01.91	TOTALE (kg)
B	FINAL UPDATING	22.05.91	CL	CONTROLLATO		
				APPROVATO		

ANSALDO Industria

NUMERO 9.9.0.2.7.6 DESCRIZIONE OVERALL DIMENSIONS

DESCRIZIONE ESTESA ET 450 W 4

STABILIMENTO DI MONFALCONE | GRUPPO TECNICO A.D.3.5.2.B.W | FORMATO D | FOGLIO N. 1 | N. FOGLI 1

SOSTITUISCE

SOSTITUITO DA

RESULT OF JGC'S REVIEW — JOB No 0 6 0 0 0

[ ] REVIEWED WITHOUT COMMENT
[X] COMMENTED AS MARKED
RESUBMISSION FOR FURTHER REVIEW IS
[ ] NECESSARY BY ( )
[X] NOT NECESSARY

REVIEWED BY — DEPT — Name & Sign — DATE 91.12.9

NIOC DOC. No. P O 0 5 - 1 0 3 8 - D W O 5 5 -

JV(JGC) DOC. No. PURCHSE ORDER No V-2156-101-A-055 SERIAL SIZE A1 REV

REV.	DATE	DESCRIPTION	PREP.	CHECK	APPR.
4	11-11-91	DETAILS *1 & *2 ADDED	SD		
3	9-10-91	REVISED AS SHOWN	MV.		
2	18-6-91	FINAL UPDATING			
1	10-5-91	REVISED AS PER JGC COMMENTS			
0	18-2-91	DRAWN			

NATIONAL IRANIAN OIL COMPANY
REFINERIES ENGINEERING AND CONSTRUCTION.
ARAK REFINERY پالایشگاه اراک

JGC CORPORATION TPL — JOINT VENTURE

DRAWING TITLE

OVERALL DIMENSIONS ET-450-W4
ELECTRIC MOTOR FA-101-A-M/B-M
FOR CRUDE HEATER "H-101.
CDU

SCALE 1 — N.I.O.C. PAGE No. 2219

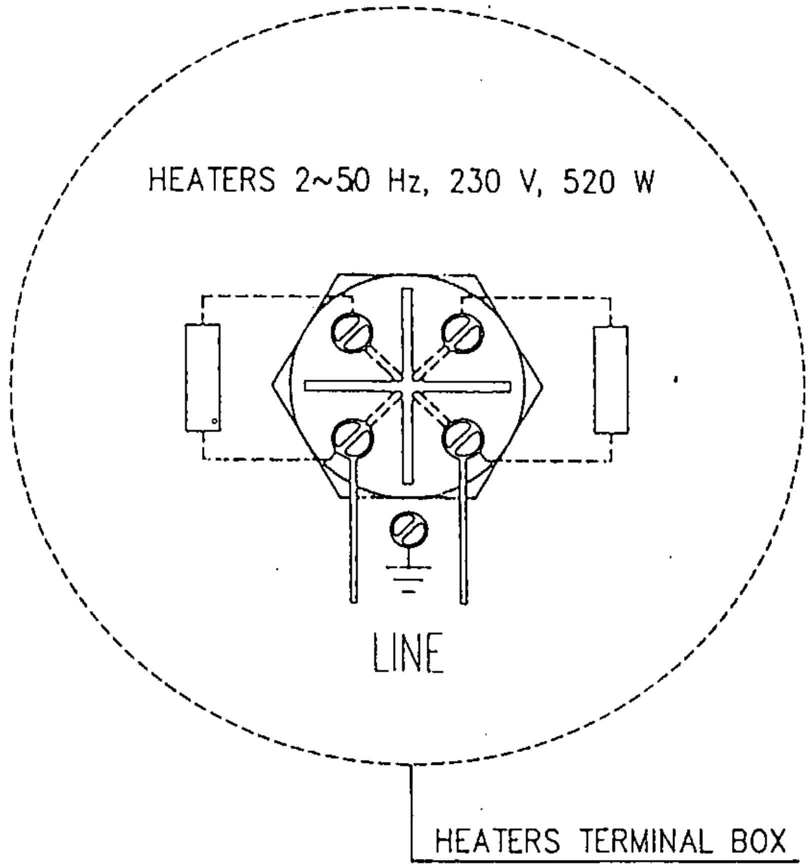
JOB. NO. 0-6000 — AREA CODE CA 11

JV NO — DWG NO. V-2156-101-A-055

N.I.O.C. DWG NO. — REV.

-J-P005-1038-DW055 4

CONFIRMED DOCUMENT



RESULT OF JGC'S REVIEW — JOB No. 0 6000

☑ REVIEWED WITHOUT COMMENT
☐ COMMENTED AS MARKED
RESUBMISSION FOR FURTHER REVIEW IS
☐ NECESSARY BY ( )
☐ NOT NECESSARY

REVIEWED BY — DATE 10 JUL 91
DEPT. ELEC
Name & Sign

NIOC DOC. No. PO 05-1038-DW056-2

JV(JGC) DOC. No. V-2156-101-A-056-A3-2 (PURCHSE ORDER No. / SERIAL / SIZE / REV)

REV.	DATE	DESCRIPTION	PREP.	CHECK	APP
2	18-6-91	3rd ISSUED			
1	10-5-91	REVISED AS PER JGC COMMENTS			
0	18-2-91	DRAWN			

NATIONAL IRANIAN OIL COMPANY
REFINERIES ENGINEERING AND CONSTRUCTION.
ARAK REFINERY پالایشگاه اراک

JGC CORPORATION TPL
JOINT VENTURE

DRAWING TITLE

AUXLIARY CIRCUITRY DIAGRAM
MOTOR TYPE ET-450-W4 FA-101AM/BM
FOR CRUDE HEATER "H-101"
CDU

N.I.O.C. 2219

JOB. NO. 0-6000 — AREA CODE CA11

J/V NO — DWG NO. V-2156-101-A-056

N.I.O.C. DWG NO. — REV

-J-P005-1038-DW056 — 2

COMM. 3.245.3949

REV	DESCRIPTION	DATE	DRAWN	CHKD	APPR	REV	DESCRIPTION	DATE	DRAWN	CHKD	APPR
5						2	3rd ISSUE	28.05.91	VARLJEN		
4						1	2nd ISSUE	07.05.91	VARLJEN		
3						0	1st ISSUE	28.01.91	ROSSO		

ANSALDO Industria

AUXILIARY CIRCUITRY DIAGRAM
MOTOR TYPE ET 450 W4

990249-410XX4

NEXT SH. / SHEET

REV 0 1 2

NATIONAL IRANIAN OIL COMPANY ARAK REFINERY PROJECT پالایشگاه اراک JGC CORPORATION TPL... JOINT VENTURE	DATA SHEET FOR INDUCTION MOTOR	ITEM NO. : FA - 101 A-M / B-M QTY : 2 P.O. NO. : ED / 018 / 22101680	

REV.	4	5		
DATE	22.07.91	20.08.91		
PRP'D	[signature]	[initials]		
APR'D				

REQUIREMENTS AND CONDITIONS

	SERVICE	: OUTDOOR
	AREA CLASSIFICATION	: CL 1 DIV. 2 GROUP D NON HAZARDOUS
	AMBIENT TEMPERATURE	: MAX. 43 °C, MIN. -20 °C
	ALTITUDE	: 1878 m
	RATED VOLTAGE	: 6000 V, 3 ph. 50 Hz
	COOLING METHOD	: IC 0151
	DEGREE OF PROTECTION	: IP 55
	TYPE OF ENCLOSURE	: EExd II B
	TEMPERATURE CLASS	: T3 IEC Publication 79-7 or NEC
	TIME RATING	: CONTINUOUS
	REQUIRED OUTPUT AT SITE CONDITION	: 400 kW
	SERVICE FACTOR	: 1.0
	NO. OF POLES	: 4
	TYPE OF MOUNTING	: IM 1001
	ROTATION (viewed from coupling side)	: CW
	STARTING METHOD	: FULL VOLTAGE
	CONSTRUCTION CODE	: IEC
	MAIN TERMINAL BOX THREAD SIZE	: M50 × 1.5 mm
	MAIN TERMINAL BOX CABLE TYPE & SIZE	: 3C - 50 mm²
	ROTATION FACING MOTOR DRIVE END CCW	

		T.O. THREAD SIZE
5	SPACE HEATER : REQUIRED/	M25 mm
5	WINDING TEMP DETECTORS : /NOT REQUIRED	/ mm

5	C.T. FOR DIFF. RELAY :	/NOT REQUIRED
	C.T. RATIO :	—
	THREAD SIZE OF T.O. FOR C.T. :	— mm
	NOISE :	LESS THAN 85 dB(A)
	FINISH COLOUR :	RAL 5010

DRIVEN MACHINE DATA

5	TYPE :	FAN / CENTRIF./RECIPRO./ROTARY
	MANUFACTURER :	CBI ENGINEERING
	COUNTER TORQUE :	2140 Nm
	B.H.P. :	331 kW
	MOMENT OF INERTIA (GD²) :	780 kg·m²
	REQ'D END PLAY :	DE — mm, NDE — mm
	THRUST :	UP — kg, DOWN — kg
	COUPLING METHOD :	DIRECT
	HALF COUPLING :	SUPPLIED BY CBI MANUFACTURER
		AT MOTOR SIDE FITTED BY FAN MANUFACTURER

REMARKS: Vendor shall complete this data sheet.
* THE DATA MARKED * WILL BE ADVISED AFTER RECEIPT OF VENDOR'S DATA FILLED IN THIS FORMAT.

PERMISSIBLE TEMP. RISE OF ROTOR : 80 °C.

MOTOR MANUFACTURER'S DATA

	MANUFACTURER	: ANSALDO INDUSTRIA SpA
	MANUFACTURER ORDER NO.	: 3.245.3949
	SERIAL NO.	: 64122 / 123
	MOTOR DWG. NO.	: 990276
	STANDARD :	CONSTRUCTION FOR HAZARDOUS AREAS CESI, PERFORMANCES IEC, DIMENSIONS IEC
	TYPE AND/OR FRAME SIZE	: ET 450 W4
	STATOR WINDING CONNECTION	: STAR.
	INSULATION CLASS & TEMP. RISE	: INS. CLASS F TEMP. 77 deg C
	RATED OUTPUT/CURRENT AT SITE	: 400 kW 45.8 A
	RATED SPEED	: 1480 rpm
	POWER FACTOR	: F.L. 89 %, 3/4 LOAD 87 %, 1/2 LOAD 82 %
	EFFICIENCY	: F.L. 94.5 %, 3/4 LOAD 94.4 %, 1/2 LOAD 93.4 %
	LOCKED ROTOR CURRENT	: 500 %
	LOCKED ROTOR TORQUE	: 80 %
	PULL UP/OUT TORQUE	: UP 80 % / OUT 230 %
	STARTING TIME	: 27 SEC. AT 80% VOLT / 14 SEC. AT 100% VOLT
4	PERMISSIBLE LOCKED ROTOR TIME	: 25 SEC (COLD) 19 SEC. HOT
	MOTOR ROTOR INERTIA (GD²)	: 45 kg·m²
	BEARING TYPE AND/OR NO.	: DE ROLLING, NDE BALL
	LUBRICATION SYSTEM	: GREASE
	REGREASING INTERVAL	: 1500 h
	END PLAY	: DE — mm, NDE — mm
	WEIGHT	: ROTOR 500 kg, TOTAL 2880 kg
	SPACE HEATER	: 220 V, 1 ph, 50 Hz, 520 W
	HEATING / COOLING TIME CONSTANT : 25 / 38 min.	

4) PERMISSIBLE LOCKED ROTOR TIMES ARE CALCULATED AT 100% RATED VOLTAGE. F.U.J. CONFIRMS THAT MOTORS CAN START WITHOUT INJURIOUS HEATING.

S-00-1380-002 (10/30)

24/07/91 16:44

Data Sheet
For P-1301 A/B/C
(Feed Pumps)
Gas Oil Hydrotreater Unit

Rev	Description	Date	Prepared	Checked	Approved	AC
01	Issued for Approval	11-Nov-2008	T.D.	M.C.	M.C.	
00	Issued for Approval	21-Apr-2008	T.D.	M.C.	M.C.	

6650-U13-RED-DAS-0116 | POD EX | POI IFE | Status: IFA

File Ref.:C:\Documents and Settings\g shirmohammadi\Desktop\red\DS-46-13-416-01.xls

CENTRIFUGAL PUMP DATA SHEET, SI UNIT

APPLICABLE TO: ● PROPOSAL ○ PURCHASE ☐ AS BUILT

FOR: N.I.O.E.C — UNIT: Gas Oil Hydrotreater

SITE: SHAZAND ARAK REFINERY — SREVICE: Feed Pumps

No. of Req'd: ---- 3 Service 2 / Stand by ---- 1

NOTES : INFORMATION BELOW TO BE COMPLETED ○ BY PURCHASER ☐ BY MANUFACTURER ☐ BY MANUFACTURER OR PURCHASER

● DATA SHEETS

	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED
PUMP	P-1301 A/B/C	●		○		○
MOTOR	P-1301 A/B/C-M	○		○		○
GEAR		○		○		○
TURBINE		○		○		○

APPLICABLE OVERLAY STANDARD(S) :

REVISIONS

NO	DATE	BY
1		
2		
3		
4		
5		

Rev

● OPERATING CONDITIONS (5.1.3)

FLOW, NORMAL 180 (m^3/h) RATED 180 (m^3/h)

OTHER 90 (50% nor. Flowrate)

SUCTION PRESSURE MAX / RATED 11 / 2,03 (barg)

DISCHARGE PRESSURE 117,9 (barg)

DIFFERENTIAL PRESSURE 115,8 (bar)

DIFF. HEAD 1392 (m) NPSHA 34,2 (m)

PROCESS VARIATIONS (5.1.4)

STARTING CONDITIONS (5.1.4) Auto Start

SERVICE: ● CONT ○ INTERMITTENT (STARTS/DAY)

● PARALLEL OPERATION REQ'D (5.1.13)

● SITE DATA (5.1.3)

LOCATION: (5.1.30)

○ INDOOR ○ HEATED ● OUTDOOR ● UNHEATED

● ELECTRICAL AREA CLASSIFICATION (5.1.24 / 6.1.4)

CL 1 GR D DIV 2

● WINTERIZATION REQ D. ● TROPICALIZATION REQ D.

SITE DATA (5.1.30)

● ALTITUDE 1878 (m) BAROMETER 0,82 (bar)

● RANGE OF AMBIENT TEMPS MIN,MAX. -28 / 43 (°C)

● RELATIVE HUMIDITY:NORMAL 73 (%)

UNUSUAL CONDITIONS: (5.1.30) ● DUST ○ FUMES

○ OTHER

● DRIVER TYPE

● INDUCTION MOTOR ○ STEAM TURBINE ○ GEAR

○ OTHER

● MOTOR DRIVER (6.1.1 / 6.1.4)

MANUFACTURER WEG

1120 (kw) ☐ 2980 (r/min)

FRAME 500 ENCLOSURE IP55

HORIZONTAL ☐ VERTICAL ☐ SERVICE FACTOR

VOLTS / PHASE / HERTZ 6000 / 3 / 50

● TYPE TEFC

○ MINIMUM STARTING VOLTAGE (6.1.5)

INSULATION F ● TEMP. RISE B

☐ FULL LOAD AMPS

☐ LOCKED ROTOR AMPS

STARTING METHOD DOL

☐ LUBE

BEARINGS (TYPE / NUMBER) :

RADIAL ball / ball

THRUST ball / ball

☐ VERTICAL THRUST CAPACITY

UP (N) DOWN (N)

● LIQUID (5.1.3)

LIQUID TYPE OR NAME FEED (Note 13)

● HAZARDOUS ○ FLAMMABLE (5.1.5)

	MIN.	NORMAL	MAX.
PUMPING TEMP (°C)		50	
VAPOUR PRESS . (barA)		0,01	
RELATIVE DENSITY (SG):		0,8483	
VISCOSITY (cP)		2,2	

SPECIFIC HEAT, C_P (kj/kg .k.)

○ CHLORIDE CONCENTRATION (6.5.2.4) (mg/kg)

○ H2S CONCENTRATION (molfraction) WET (5.12.1.12c)

CORROSIVE / EROSIVE AGENT (5.12.1.9)

MATERIALS (5.12.1.1)

● ANNEX H CLASS (5.12.1.1) S-1 (NOTE 3)

● MIN DESIGN METAL TEMP (5.12.4.1) -28 (°C)

○ REDUCED HARDNESS MATERIALS REQ D. (5.12.1.12)

BARREL / CASE A266-Gr2 IMPELLER A487-CA6NM 1

CASE / IMPELLER WEAR RINGS A743 -CA40 HD 0

SHAFT A276-410A ■ SUCT. NOZZ A216-WCB 1

DIFFUSERS A487-CA6NM 1

COVER /DISH. NOZZLE A266-Gr2 / A216-WCB 1

☐ PERFORMANCE 1

PROPOSAL CURVE NO. AHPBDS375/150A rev.1 ☐ 2980 (r/min) 0

IMPELLER DIA RATED 366 MAX. 382 MIN 320 (mm) 1

IMPELLER TYPE closed 0

RATED POWER 933,7 (kw) EFFICIENC' 62 (%) 0

MINIMUM CONTINUOUS FLOW : 0

THERMAL (m^3/h) STABLE 70 (m^3/h) 0

PREFERRED OPER. REGION 154 TO 264 (m^3/h) 0

ALLOWABLE OPER. REGION 70 TO 286 (m^3/h) 0

MAX. HEAD @ RATED IMPELLER 1535 (m) 0

MAX. POWER @ RATED IMPELLER 1026 (kw) 0

NPSHR AT RATED FLOW 3,7 (m) (5.1.10) 0

MAX SUCTION SPECIFIC SPEED : 190 (5.1.11) 0

MAX . SOUND PRESS LEVEL REQ. D NOTE 1 (dba) (5.1.16)

☐ EST MAX. SOUND PRESS LEVEL (dba) (5.1.16)

☐ EST MAX. SOUND POWER LEVEL (dba) (5.1.16)

● UTILITY CONDITIONS (5.1.3)

ELECTRICITY	VOLTAGE	PHASE	HERTZ
DRIVERS	6000 & 400	3	50
HEATING			

SYSTEM VOLTAGE DIP ● 80% ○ OTHER (6.1.5) 1

STEAM	MAX. PRESS.	MAX. TEMP	MIN. PRESS.	MIN. TEMP	
DRIVERS					1
HEATING	4.1 barg	250 °c		210 °c	1

COOLING WATER: (5.1.19) SOURCE

SUPPLY TEMP. 29 (°C) MAX. RETURN TEMP. 46 (°C)

NORM. PRESS. 3,9 (barg) DESIGN PRESS. 6.9 @ 65°c (barg)

MIN. RET. PRESS. 2,9 (barg) MAX. ALLOW. D.P. 1,0 (bar)

CHLORIDE CONCENTRATION : (mg/kg)

CENTRIFUGAL PUMP DATA SHEET, SI UNIT

CONSTRUCTION

ROTATION (VIEWED FROM COUPLING END) ☐ CW ■ CCW

PUMP TYPE : (4.1)

☐ BB1 ☐ BB2 ☐ BB3 ■ BB5 **(NOTE 3)**

CASING MOUNTING:

☐ CENTERLINE ■ NEAR CENTERLINE

☐ FOOT

CASING SPLIT :

☐ AXIAL ■ RADIAL

CASING TYPE :

☐ SINGLE VOLUTE ☐ MULTIPLE VOLUTE ☐ DIFFUSER

☐ BETWEEN BEARINGS ☐ BARREL

CASE PRESSURE RATING :

■ MAX ALLOWABLE WORKING PRESSURE **146** (bar)

@ **85** (°C)

■ HYDRO TEST PRESSURE **219** (bar)

○ SUCTION PRESS REGIONS MUST BE DESIGNED FOR MAWP (5.3.6)

☐ NOZZLE CONNECTIONS : (5.4.2) **(NOTE 3)**

	SIZE (DN)	FLANGE RATING	FACING	POSITION
SUCTION	**8"**	**1500#**	**RF**	**TOP**
DISCHARGE	**6"**	**1500#**	**RF**	**TOP**
BALANCE DRUM				

PRESSURE CASING AUX. CONNECTIONS : (5.4.3)

	NO.	SIZE (DN)	TYPE
■ DRAIN	**3 (14)**	**3/4**	**valved**
■ VENT	**4 (14)**	**3/4**	**valved**
☐ PRESS. GAUGE			
☐ TEMP GAUGE			
☐ WARM -UP			
☐ BALANCE / LEAK-OFF			

☐ MACHINED AND STUDDED CONNECTIONS (5.4.3.8)

○ CYLINDRICAL THREADS REQUIRED (5.4.3.3)

ROTOR :

● COMPONENT BALANCE TO ISO 1940 G1.0 (5.9.4.4)

○ SHRINK FIT-LIMITED MOVEMENT IMPELLERS (8.2.2.3)

COUPLINGS :(6.2.2) **(NOTE 6)**

● MANUFACTURER **John Crane** ☐ MODEL **TSKS**

■ RATING (kw per 100 r/min) **0740**

■ SPACER LENGTH **280** (mm) ■ SERVICE FACTOR **MIN 1.5**

DRIVER HALF COUPLING MOUNTED BY:

● PUMP MFR. ○ DRIVER MFR. ○ PURCHASER

○ COUPLING WITH HYDRAULIC FIT (6.2.10)

○ COUPLING BALANCED TO ISO 1940-1 G6.3 (6.2.3)

○ COUPLING PER ISO 14691 (6.2.4)

○ COUPLING PER ISO 10441 (6.2.4)

○ COUPLING PER API 671 (6.2.4)

● NON SPARK COUPLING GUARD (6.2.14c)

○ COUPLING GUARD STANDARD PER (6.2.14a)

BASEPLATES:

☐ API BASEPLATE NUMBER (ANNEX D)

○ NON-GROUT CONSTRUCTION (6.3.1..3)

○ OTHER

MECHANICAL SEAL : (5.8.1) **(NOTE 2)**

■ SEAL MANUFACTURER	**BURGMANN**
● CATEGORY	**2**
● TYPE (SEAL CODE)	**A**
● ARRANGEMENT	**1**
● SEAL/AUXILIARY PLAN	**11/65**

SEAL CONSTRUCTION:

☐ SLEEVE MATERIAL

☐ GLAND MATERIAL

☐ AUX SEAL DEVICE (2.7.3.20)

☐ JACKET REQUIRED (2.7.3.17)

SEAL CHAMBER DATA: (2.1.6/2.1.7)

☐ TEMPERATURE (°C)

☐ PRESSURE (BARG)

☐ FLOW (LIT/MIN)

SURFACE PREPARATION AND PAINT

○ MANUFACTURERS STANDARD ○ OTHER (SEE BELOW)

● SPECIFICATION NO. **SP-2260-80-2 (REV. 02)**

PUMP :

● PUMP SURFACE PREPARATION

● PRIMER

● FINISH COAT

BASEPLATE : (6.3.17)

● BASEPLATE SURFACE PREPARATION

● PRIMER

● FINISH COAT

○ DETAILS OF LIFTING DEVICES (6.3.20)

SHIPMENT : (7.4.1)

○ DOMESTIC ● EXPORT ● EXPORT BOXING REQUIRED

● OUTDOOR STORAGE MORE THAN 6 MONTHS For 12 Mo. — 0

SPARE ROTOR ASSEMBLY PACKAGED FOR :

○ SHIPPING CONTAINER (8.2.8.3) ○ VERTICAL STORAGE (8.2.8.2) — 0

○ TYPE OF SHIPPING PREPARATION ○ N2 PURGE (8.2.8.4)

HEATING AND COOLING

○ HEATING JACKET REQ D. (5.8.9) ☐ COOLING REQ D.

☐ COOLING WATER PIPING PLAN (6.5.3.1)

C.W. PIPING:

■ PIPE ☐ TUBING : FITTINGS — 1

C.W. PIPING MATERIALS : — 0

☐ S.STEEL ☐ C.STEEL ☐ GALVANIZED

COOLING WATER REQUIREMENTS :

☐ BEARING HOUSING (m^3/h) @ (bar)

☐ HEAT EXCHANGER (m^3/h) @ (bar) — 0

STEAM PIPING ○ TUBING ○ PIPE — 0

BEARINGS AND LUBRICATION

BEARING (TYPE / NUMBER) (5.10.1)

■ RADIAL **sleeve** — 0

■ THRUST **ball** — 0

LUBRICATION (5.11.3 , 5.11.4) :

■ RING OIL ☐ HYDRODYNAMIC ○ PURGE OIL MIST ○ PURE OIL MIST — 0

● CONSTANT LEVEL OILER PREFERENCE (5.10.2.2)

○ PRESSURE LUBE SYS. ISO 10438-3 ○ ISO 10438-2 (8.2.6.1/8.2.6.5)

■ OIL VISC. ISO GRADE **ISO VG 68** — 1

○ OIL PRESSURE TO BE GREATER THAN COOLANT PRESSURE

○ REVIEW AND APPROVE THRUST BEARING SIZE (8.2.5.2.4) — 0

☐ OIL HEATER REQUIRED : ○ STEAM ○ ELECTRIC

INSTRUMENTATION (6.4.2) — 1

○ SEE ATTACHED API-670 DATA SHEET

○ ACCELEROMETER (S) (6.4.2.1)

○ PROVISION FOR VIBRATION PROBES (6.4.2.2)

○ RADIAL PER BRG. ○ AXIAL PER BRG.

○ PROVISION FOR MOUNTING ONLY (5.10.2.11)

○ FLAT SURFACE REQ D (5.10.2.12)

○ RADIAL BEARING METAL TEMP ○ THRUST BRG METAL TEMP.

○ TEMP GAUGES (WITH THERMO WELLS)

○ MONITORS AND CABLES SUPPLIED BY (6.4.2.4)

REMARKS

■ MASSES (kg)

PUMP	BASEPLATE
DRIVER	TOTAL
GEAR	

CENTRIFUGAL PUMP DATA SHEET, SI UNIT

SPARE PARTS (TABLE 18)

- ● START-UP ● NORMAL MAINTENANCE
- ● SPECIFY (NOTE 8)

OTHER PURCHASER REQUIREMENTS

- ● COORDINATION MEETING REQUIRED (9.1.3)
- ○ MAXIMUM DISCHARGE PRESSURE INCLUDE (5.3.2)
  - ○ MAX. RELATIVE DENSITY
  - ○ MAX. DIA. IMPELLER AND / OR NO. OF STAGES
  - ○ OPERATION TO TRIP SPEED
- ○ CONNECTION DESIGN APPROVAL (5.1.2.3.4 , 8.2.1.4)
- ○ INERT GAS INHIBITED STORAGE - SPARE CARTRIDGE (8.2.8.4)
- ○ TORSIONAL ANALYSIS REQUIRED (5.9.2.1)
- ○ TORSIONAL ANALYSIS REPORT (5.9.2.6)
- ● PROGRESS REPORTS (9.3.3)
- ○ OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)
- ○ ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.2.10)
- ☐ LATERAL ANALYSIS REQUIRED (8.2.4.1 / 8.2.4.1.3)
- ☐ DYNAMIC BALANCE ROTOR (8.2.4.2)
- MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)
  - ■ VENT ■ DRAIN ■ COOLING WATER
- ☐ MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)
- ☐ FLANGES REQ D IN PLACE OF SOCKET WELD UNIONS (6.5.2.8)
- CONNECTION BOLTING
  - ○ PTFE COATING ○ ASTM A153 GALVANIZED
  - ○ PAINTED ○ SS
- ■ INSTALLATION LIST IN PROPOSAL (9.2.3L)

QA INSPECTION AND TESTING (Note 4)

- ● SHOP INSPECTION (7.1.4)
- ● PERFORMANCE CURVE APPR.
- ☐ TEST WITH SUBSTITUTE SEAL (7.3.3.2)
- ● MATERIAL CERTIFICATION REQUIRED (5.12.1.8)
  - ● CASING ● IMPELLER ● SHAFT
  - ● OTHER **SHAFT SLEEVES, WEAR RINGS MECHANICAL SEAL STEEL PARTS**
- ○ CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2.5)
- ■ INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.3.4e)
  - ☐ MAG PARTICLE ■ LIQUID PENETRANT
  - ■ RADIOGRAPHIC ☐ ULTRASONIC
- ■ INSPECTION REQUIRED FOR CASTINGS (7.2.1.3)(5.12.1.5)
  - ■ MAG PARTICLE ☐ LIQUID PENETRANT
  - ☐ RADIOGRAPHIC ☐ ULTRASONIC
- ○ HARDNESS TEST REQUIRED : (7.2.2.3)
- ○ ADDITIONAL SURFACE / SUBSURFACE EXAM INATION (7.2.1.3)
  - FOR
  - METHOD

QA INSPECTION AND TESTING (CONT.)

TEST	NON-WIT	WIT	OBSERVE	Rev.
● HYDROSTATIC (7.3.2)	●	○	○	0
● PERFORMANCE (7.3.3)	○	●	○	0
● NPSH (7.3.4.2)	○	○	●	0
○ RETEST ON SEAL LKGE (7.3.3.2d)	○	○	○	
○ RETEST REQUIRED AFTER FINAL HEAD ADJUSTMENT (7.3.3 Sb)	○	○	○	
○ COMPLETE UNIT TEST (7.3.4.3)	○	○	○	
● SOUND LEVEL TEST (7.3.4.4)	○	●	○	0
○ CLEANLINESS PRDR TO FINAL ASSEMBLY (7.2.2.2)	○	○	○	
○ NOZZLE LOAD TEST (6.3.6)	○	○	○	
○ CHECK FOR CO-PLANNER MOUNTING PAD SURFACE (6.3.3)	○	○	○	
○ MECHANICAL RUN UNIT OIL TEMP P. STABLE (7.3.4.7.1)	○	○	○	
○ 4 HR. MECHANICAL RUN AFTER OIL TEMP STABLE (7.3.4.7.3)	○	○	○	
● 4 HR. MECH. RUN TEST (7.3.4.7.2)	○	●	○	0
○ TRUE PEAK VELOCITY DATA (7.3.3.4D)	○	○	○	
○ BRG HSG RESONANCE TEST (7.3.4.6)	○	○	○	
○ REMOVE / INSPECT HYDRODYNAMIC BEARINGS AFTER TEST (8.2.7.5)	○	○	○	
○ AUXILIARY EQUIPMENT TEST (7.3.4.5)	○	○	○	
☐ CHARPY TEST (EN 1.344.5/ASME VID	○	○	○	
○	○	○	○	
○	○	○	○	
○	○	○	○	

- ● VENDOR KEEP REPAIR AND HT RECORDS (7.2.11C)
- ● VENDOR SUBMIT TEST PROCEDURES (7.3.1.2 / 9.2.5)
- ● VENDOR SUBMIT TEST DATA WITHIN 24 HOURS (7.3.3.3E)
- ● INCLUDE PLOTTED VIBRATION SPECTRA (5.9.3.3)
- ● RECORD FINAL ASSEMBLY RUNNING CLEARANCES
- ● COMPLETION OF INSPECTION CHECK LIST (7.1.6)

REMARKS

CENTRIFUGAL PUMP DATA SHEET, SI UNIT

APPLICABLE TO: ● PROPOSALS ○ PURCHASE ☐ AS BUILT

FOR **N.I.O.E.C** UNIT **Gas Oil Hydrotreater**

SITE **SHAZAND ARAK REFINERY** SERVICE **Feed Pumps**

Rev

NOTES INFORMATION BELOW TO BE COMPLETE BY ○ PURCHASER ☐ BY MANUFACTURER ☐ BY MANUFACTURER OR PURCHASER

PRESSURE VESSEL DESIGN CODE REFERENCES.

☐ THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER

CASTING FACTORS USED IN DESIGN (5.3.4) (TABLE 3)	☐
SOURCE OF MATERIAL PROPERTIES	☐

WELDING AND REPAIRS (5.12.3)

THESE REFERENCES MUST BE LISTED BY THE PURCHASER. DEFAULT TO TABLE 10 IF NO PURCHASER PREFERENCE IS STATED)

○ ALTERNATIVE WELDING CODES AND STANDARDS (5.12.3.1)

WELDING REQUIREMENT (APPLICABLE CODE OR STANDARD)	PURCHASER DEFINED	DEFAULT PER TABLE 10
WELDER OPERATOR QUALIFICATION	○	●
WELDING PROCEDURE QUALIFICATION	○	●
NON-PRESSURE RETAINING STRUCTURAL WELDING SUCH AS BASEPLATES OR SUPPORTS	○	●
MAGNETIC PARTICLE OR LIQUID PENETANT EXAMINATION OF THE PLATE EDGES	○	●
POST WELD HEAT TREATMENT (IF REQUIRED)	○	●
POST WELD HEAT TREATMENT OF CASING FABRICATION WELDS(IF REQUIRED)	○	●

MATERIAL INSPECTION (7.2.2.1)(7.2.1.3)

THESE REFERENCES MUST BE LISTED BY THE PURCHASER. DEFAULT TO TABLE 10 IF NO PURCHASER PREFERENCE IS STATED)

ALTERNATIVE MATERIAL INSPECTIONS AND ACCEPTANCE CRITERIA (SEE TABLE 13)

TYPE OF INSPECTION	METHODS	FOR FABRICATIONS	CASTINGS
RADIOPRAPGY			
ULTRASONIC INSPECTION			
MAGNETIC PARTICLE INSPECTION			
LIQUID PENETRANT INSPECTION			

REMARKS

CENTRIFUGAL PUMP DATA SHEET, SI UNIT

REMARKS

NOTE 1 : Equipment sound pressure level shall not exceed 85 db(A) anywhere at a distance of 1 m from the equipment surface; a reduction of 3 db(A) shall be made for each item of 2-component train.

NOTE 2 : Mechanical seal shall be as per API 682 and Vendor shall fill-out datasheet of API 682 during detail engineering phase.Also specified seal specification in this data sheet shall be reviewed and verified by pump and seal vendor.

NOTE 3 : To be reviewed and confirmed by pump vendor.

NOTE 4 : For Inspection and Test, refer to "Inspection & Test Plan for rotating equipment" Doc. No. SP-2260-90-262-00

NOTE 5 : Deleted

NOTE 6 : Flexible spacer type coupling shall be used.

NOTE 7 : Deleted

NOTE 8 : As per relevant requisition for process centrifugal pumps. (for 1 year)

NOTE 9 : Three pumps: 100% design capacity each one (180m3/h). Two in operation in parallel and One in spare.

NOTE 10 : Turndown : 90 m3/h (50% normal flowrate)

NOTE 11 : provision for mini flow to be specified by pump's vendor.

NOTE 12 : Electric Motors shall be governed by "Job Specification for Electrical Motors DOC. NO. :SP-2260-60-002-0(REV.00)"
Motor Enclosure shall be totally enclosed fan cooled (TEFC) with explosion protection grade of Exe-IIB-T3
And degree of protection : IP55

NOTE 13: Straight-run light gas oil+light cycle oil+cracked gas oil

NOTE 14: Vent & Drain will be manifolded as per request (Valved & Flanged)

Motor Data Sheet for item P-1301 A/B/C

Rev.	Description	Date	Prepared	Checked	Approved	AC
03	Issued for Approval	30/04/10	M.C.	M.C.	M.C.	
02	Issued for Approval	22/06/09	M.C.	M.C.	M.C.	
01	Issued for Approval	01/06/09	M.C.	M.C.	M.C.	
00	Issued for Approval	12/11/09	M.C.	M.C.	M.C.	

	1-Approved (Released for Manufacturing)	OEC Code : 8350	Unit : U13		
	2-Approved as Noted for Fabrication (Fabrication may Proceed)	Vendor Job No. : 08C100	Item No. : P-1301 A/B/C		WEIR GABBIONETA
	3-Approved as Noted for Re-Issue (Fabrication shall not Proceed)	Designation (Eq. Service,if applicable) : FEED PUMPS			
	4-Rejected	Vendor Doc. No. : 083284_MDS			
	5-Not Returned	Requisiton No. : 2260-IR-PM-2-1-0101-0			
Date :	Sign :		POD:	POI:	IFA / Status:

File Ref. : R:\JM\2008\ArakIran\08C100\Cover\MDS\083284_MDS.doc

GENERAL DATA	
Vendor's Name and Country: WEGEURO - Portugal	Design Temp. Deg.C (Min / Max): -28°C/43°C
Tag No.(s): P-1301A/B/C-M	
Quantity: 3 Sets	Altitude: 1878 m Above Sea level
App. Document.(s): SP-2260-60-002	Seismic Condition: Zone 4
	Wind Velocity: N/A
	Climate: Dusty
	Relative Humidity (Max): 100%

TECHNICAL DATA		
1-GENERAL:	**REQUIRED**	**VENDOR DATA**
1-1 Cable info.:	3x95mm2 CU/XLPE/SC/LSH/SWA/PVC	***1xM80***
1-2 Explosion Proof / IndustrialType	Ex e IIB T3	***Ex de IIB T4***
1-3 Grounding Cable	70 mm²	
1-4 Location / Service	Process Area/ Pump	
1-5 Applicable standard	IEC	
2-ELECTRICAL CHARACTERISTICS:	**REQUIRED**	**VENDOR DATA**
2-1 Motor Type	Synchronous ☐	***N/A***
	Asynchronous ☑	***Asynchronous***
2-2 Rotor Winding	Induction(Squirrel cage) ☑	***Induction***
	Wounded ☐	***N/A***
2-3 Service Factor	Duty type S1-Continious	***S1***
2-4 Duty Cycle	N/A	***N/A***
2-5 Insulation Class / Temp. Rise	F/B	***F/B***
2-6 Voltage, Variations (V), Phase	6kV,±10%, 3ph	**6KV,±10%, 3ph**
2-7 Frequency, Variations (Hz)	50HZ±5%	**50HZ±5%**
2-8 Full Load Rated Current (A)	By vendor	***120,8***
2-9 Number of Poles	By vendor	***2***
2-10 Power output Rating (kW)	By vendor	***1120***
2-11 Power Factor (%)		
1/4 Load	By vendor	88,0
2/4 Load	By vendor	93,0
3/4 Load	By vendor	93,0
Full Load	By vendor	92,0
2-12 Efficiency (%)		
1/4 Load	By vendor	***92,7***
2/4 Load	By vendor	95,7
3/4 Load	By vendor	96,7
Full Load	By vendor	97,0
2-13 Speed (RPM) Synchronic & Full Load	By vendor	**3000 / 2990**
2-14 Starting Method	DOL	**DOL**
2-15 Starting Current (A)		
1/4 Load	By vendor	**894**
2/4 Load	By vendor	**894**
3/4 Load	By vendor	**894**
Full Load	By vendor	**894**
2-16 Starting Time Coupled with driven Machine (sec)	By vendor	**15s**
2-17 Locked Rotor Current (A)	By vendor	**894**

2-18 Starting Torque (Nm)		
1/4 Load	By vendor	**2862**
2/4 Load	By vendor	**2862**
3/4 Load	By vendor	**2862**
Full Load	By vendor	**2862**
2-19 Rated Torque (Nm) at Full Load	By vendor	**3577**
2-20 Moment of Inertia GD^2 ($Kg.m^2$)	By vendor	**53,1**
2-21 Withstand Fault Current (kA)	As per IEC by vendor	
Main Terminal Box	By vendor	44 kA for 0.25 s
Auxiliary Terminal Box	By vendor	N/A
2-22 Stator Winding	Star	***Star***
2-23 Permissible locked rotor time at:		
100% voltage	By vendor	**hot/cold(s)=30/45**
80% voltage	By vendor	**hot/cold(s)=45/60**
2-24 Torque-Speed Characteristics Curve	By vendor	**83284_MSC**
3-PROTECTION AND MEASUREMENT	**REQUIRED**	**VENDOR DATA**
3-1 Motor IP / Terminal Boxes IP	IP-55/IP-55	***IP55 / IP55***
3-2 Temperature Protection for Winding and Bearing	2Pt 100 per phase for Winding ☑	Provided
	PTC ☐	N/A
3-3 Temperature Measuring for Winding and Bearing (Sleeve Bearings)	Probe ☐	N/A
	Thermo meter dial type for Bearing ☐ ☐	N/A
	NO/NC Contacts	N/A
3-4 Vibration Measuring for Bearing and Shaft	Probe ☐	N/A
	Sensor ☐	N/A
	Transmitter ☐	N/A
3-5 Noise Level	less than 85db A at 1m far from motor and in no load condition	84.8dB(A)
3-6 Space Heater:	required	Provided
Voltage	By vendor	230V (+/-5%)
Power	By vendor	500W (+/-5%)
4-MECHANICAL CHARACTERISTIC:	**REQUIRED**	**VENDOR DATA**
4-1 Motor Mounting	H	***IM1001***
4-2 Enclosure Type	OD-TF-H-D-CP	***TEFC***
4-3 Cooling Method	BY FAN	***IC411***
4-4 Fan Material	Non Sparking Type BY VENDOR	***Aluminium***
4-5 Direction of Rotation	By vendor	***C.C.W***
4-6 Canopy	required	***Provided***
4-7 Dimension	By vendor	83284_MOT
4-8 Weight	By vendor	9600kg
4-9 Frame Size	By vendor	500KH
4-10 Terminal box Arrangement	By vendor	***83284_PWBOX***
4-11 Bearings		
Type	By vendor	Anti-friction bearings
Size	By vendor	NU220C3+6220C3 / NU220C3
Method of Lubrication	By vendor	***Grease***

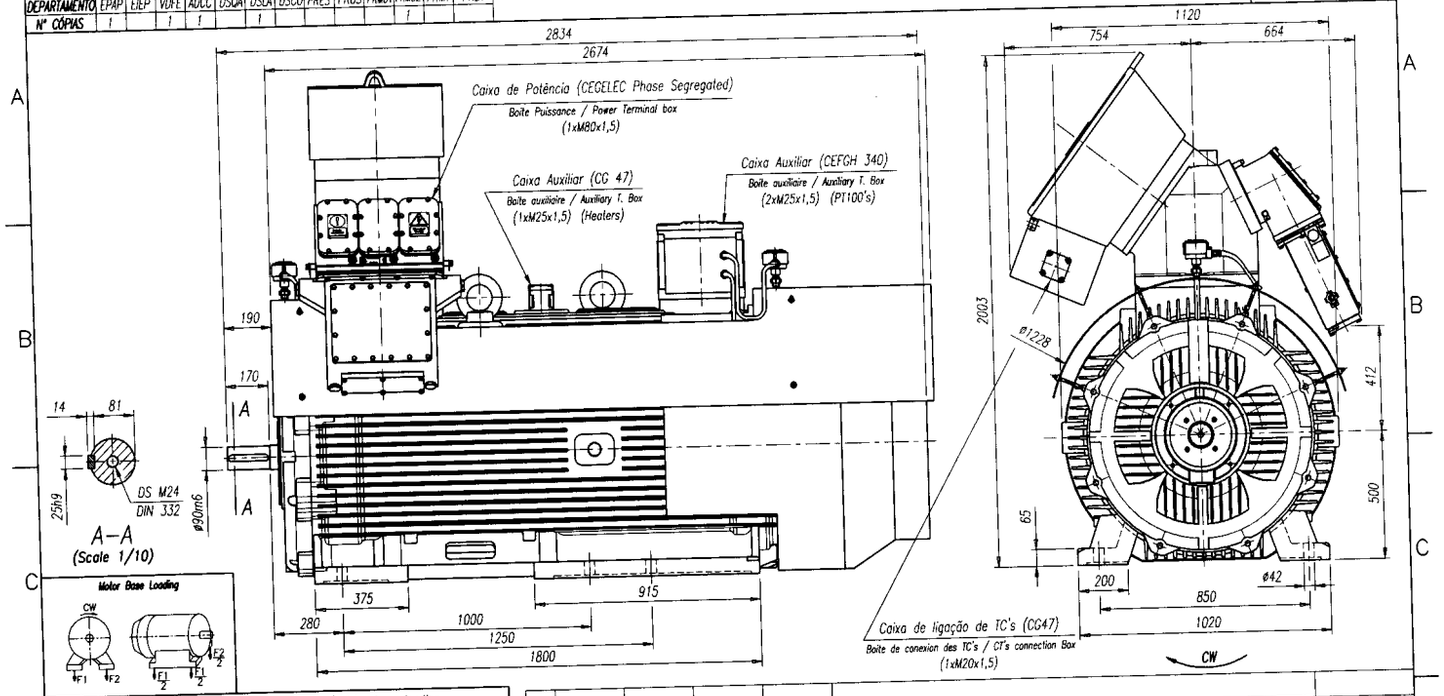
REMARKS:

OD : OUT DOOR , TF: TOTALLY ENCLOSED FAN COOLED , V: VERTICAL MOUNTED ,
B: BELT COUPLING , CP: CORROSION PROTECTED , F: FLANGE MOUNTED ,
H: HORIZONTAL MOUNTED , D:DIRECT COUPLING , CW: CLOCK WISE VIEWED FROM SHAFT END
CCW: COUNTER CLOCK WISE VIEWED FROM SHAFT END , DOL:DIRECT ON LINE START
NOTE: THREE 50/5 A , 5P10,15 V.A. RATIO WINDOW TYPE CURRENT TRANSFORMERS SHALL BE SUPPLIED AND MOUNTED IN THE MAIN POWER TERMINAL BOX FOR DIFFERENTIAL PROTECTION OF MOTOR WINDINGS.

△4

DISTRIBUIÇÃO DE CÓPIAS												
DEPARTAMENTO	EPAP	EIEP	VDFE	ADCC	DSQA	DSLA	DSCO	PRES	PRUS	PRM01	PRM02	PRMT	PRBT
Nº CÓPIAS	1		1	1		1				1			

Dimensões em mm



Motor Base Loading

Cargas nos apoios / Charges dans les apuis / Motor base loading

Carga máxima sobre os apoios (condição de curto circuito) Chargement maximum dans les apuis (condition de curt-R circuit) Maximum load (short circuit condition)	F1max	83,6kN	
Carga mínima sobre os apoios (condição de curto circuito) Chargement minime dans les apuis (condition de curt-R circuit) Minimum load (short circuit condition)	F2min	-0,3kN	
Carga estática / Charge statique / Static load	F1 = 41,7kN	F2 = 41,7N	
Carga dinâmica / Charge dynamique / Dynamic load	F1 = 45,9kN	F2 = 37,5kN	

Protecções: Resistência anticondensação (230 V, 500 W) + 6 PT100 (2/fase) na bobinagem + 2 PT100 (1/rolamento,duplex)
Protections: Resistance d'échauffement (230 V, 500 W) + 6 PT100 (2/phase) dans bobinage + 2 PT100 (1/roulement,duplex)
Protections: Space heater (230 V, 500 W) + 6 PT100 (2/phase) on windings + 2 PT100 (1/bearing,duplex)

Rolamentos / Roulements / Bearings

LA/CA/DE	LOA/COA/NDE
NU220 CJ + 6020 CJ	NU220 CJ

Rev	Data	Desenhou	Verificou	Aprovou	Alterações	Processo
					MODIFICAÇÕES	

Processo			
Des.	11/03/2009	Gabriel C.	
Verif.	11/03/2009	Gabriel C.	
Aprov.	11/03/2009	L. Araújo	
Escalas	1/20		
Norma	IEC 34 IEC 72		

TIPO DE MOTOR
W22XBE 500KH 2P Sp.2
IM1001 (B3)
ATRAVANCAMENTO
ENCOMBREMENT/DIMENSIONAL DRAWING
Ind. compl.: Motores de/Moteurs de/Motors of Un ≤ 6600 V
De acordo com/Selon/According to: ATEX 94/9/CE - Ex de IIB T4

WEGeuro-Industria Electrica,S.A.
Rua Frederico Ulrich Sector V
Apartado 6074-CP-4471 907 MAIA-Portugal
Contribuinte (VAT):PT506 177 521

Rev. 4MF6710069
Substitui:
Substituído por:

6IMRA41113A

GENERAL NOTES

REFERENCE DRAWINGS	DWG No.

KEY PLAN

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
03	25/01/10	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
02	19/02/09	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
01	16/10/08	CT box inclusion	Gabriel C.	André R.	L. Araújo	
00	14/10/08	For approval	Gabriel C.	André R.	L. Araújo	

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION CO.
SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT
NIOEC

CONTRACTOR: SAZEH CONSULTING · Oil Design & Construction Co. · SEM

DRAWING TITLE:
Motor General Arrangement Drawing

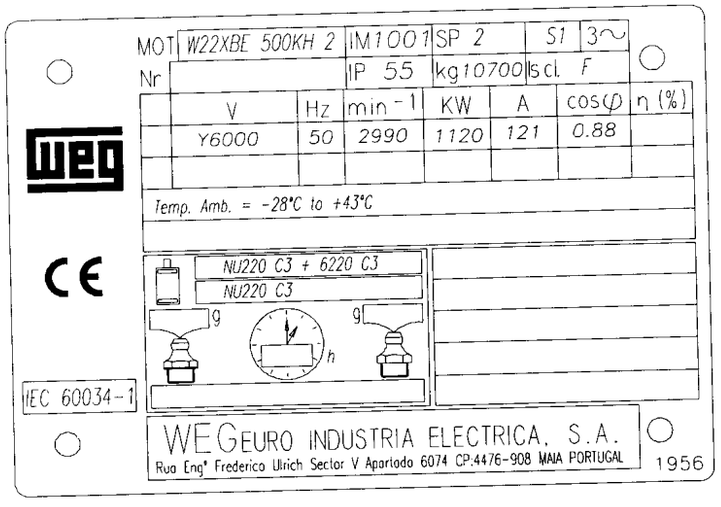
WOC Code: 8350	Unit: 13
Vendor Job No.: CE 300290	Vendor Doc No.: 83284_MOT
Item No.: P-1301 A/B/C-M	Designation: Feed Pump
NIOEC PROJ No.: 2260	Requisition No.: 2260-IR-PM-2-1-0101-0
NIOEC DWG No.: 2260-PO-PM-2-1-0101-6DW-1179-1	SIZE: A3 REV: 1 SCALE: 1:20

1. Approved (Released for Manufacturing)
2. Approved as Noted for Fabrication (Fabrication may Proceed)
3. Approved as Noted for Re-Issue (Fabrication shall not Proceed)
4. Rejected
5. Not Returned

Comments:

Date: 14/10/2008 Sign: Gabriel Correia

FILE REF.: STATUS: P.O.: P.O.D.:



DRAWING TITLE: Nameplate drawing

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION CO.
SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT
NIOEC

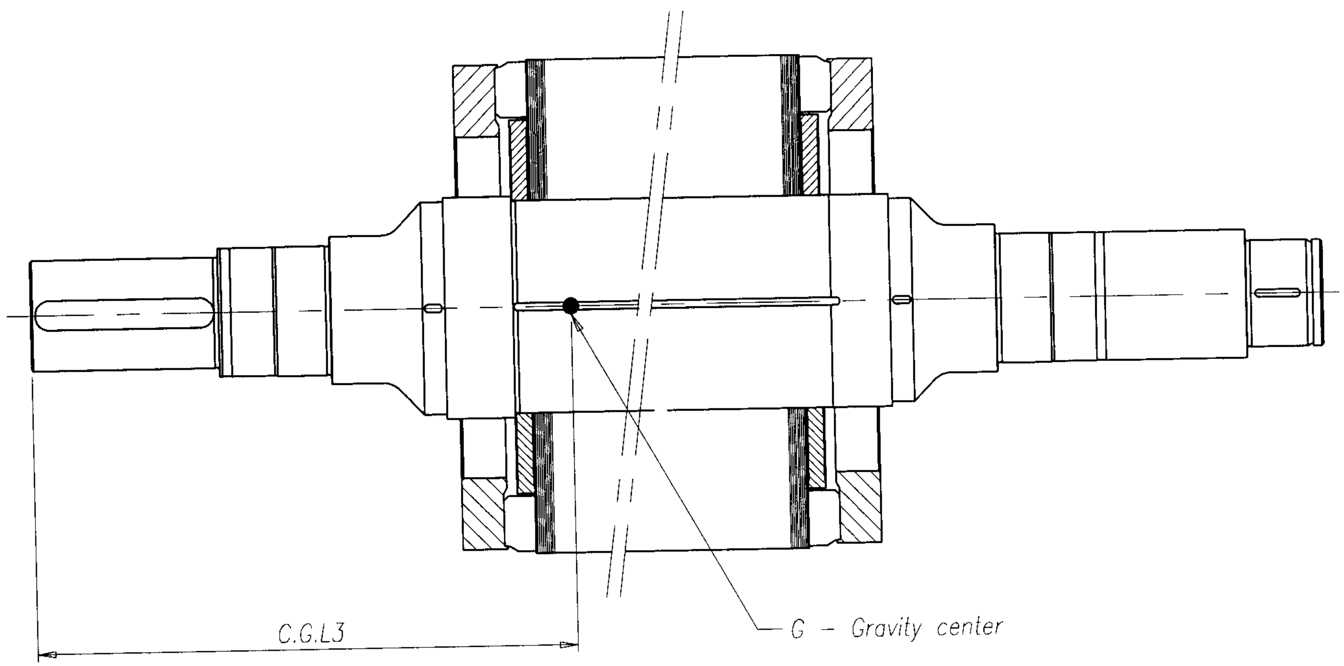
CONTRACTOR: SAZEH CONSULTANTS, Oil Design & Construction Co., SEW EURODRIVE

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	A/C
01	28.01.10	Revised by vendor	I.Seco	R.Rodrigues		
00	15.10.06	Issue after order	M.Lima	M.Lima		

FILE REF.:
STATUS: P.O.: P.O.D.:

OEC Code : 8350
Unit : 13
Vendor Job No.: CE 300290
Vendor Doc No.: 83284_MNP
Item No.: P-1301 A/B-M
Designation : (Equipment Service,if Applicable) Feed Pump
NIOEC PROJ No.: 2260
Requisition No.: 2260-IR-PM-2-1-0101-0
NIOEC DWG No.: 2260-PO-PM-2-1-0-1-0-1-6-D-W-1-7-9-2-3
SIZE: A4 REV.: 1 SCALE: -

1: Approved (Released for Manufacturing)
2 Approved as Noted for Fabrication (Fabrication may Proceed)
3 Approved as Noted for Re-issue (Fabrication shall not Proceed)
4 Rejected
5 Not Returned
Date : 15.10.2008 Sign : M. Lima
Comments :



Power kW	Weight Kg	Inertia Kg.m2	C.G. mm
1120	2146	53.1	1247

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
01	25/01/10	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
00	15.10.08	Issue after order	André R.	André R.	L. Araújo	

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL
ENGINEERING & CONSTRUCTION CO.
SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT

NIOEC

CONTRACTOR: SAZEH CONSULTANTS; Oil Design & Construction Co.; SEI

OEC Code : 8350 | Unit : 13
Vendor Job No.: CE 300290 | Vendor Doc No.: 83284_MRT
Item No.: P-1301 A/B/C-M | NIOEC PROJ No.: 2260
Designation : Feed Pump | Requisition No.: 2260-IR-PM-2-1-0101-0

DRAWING TITLE: Rotor

WEG

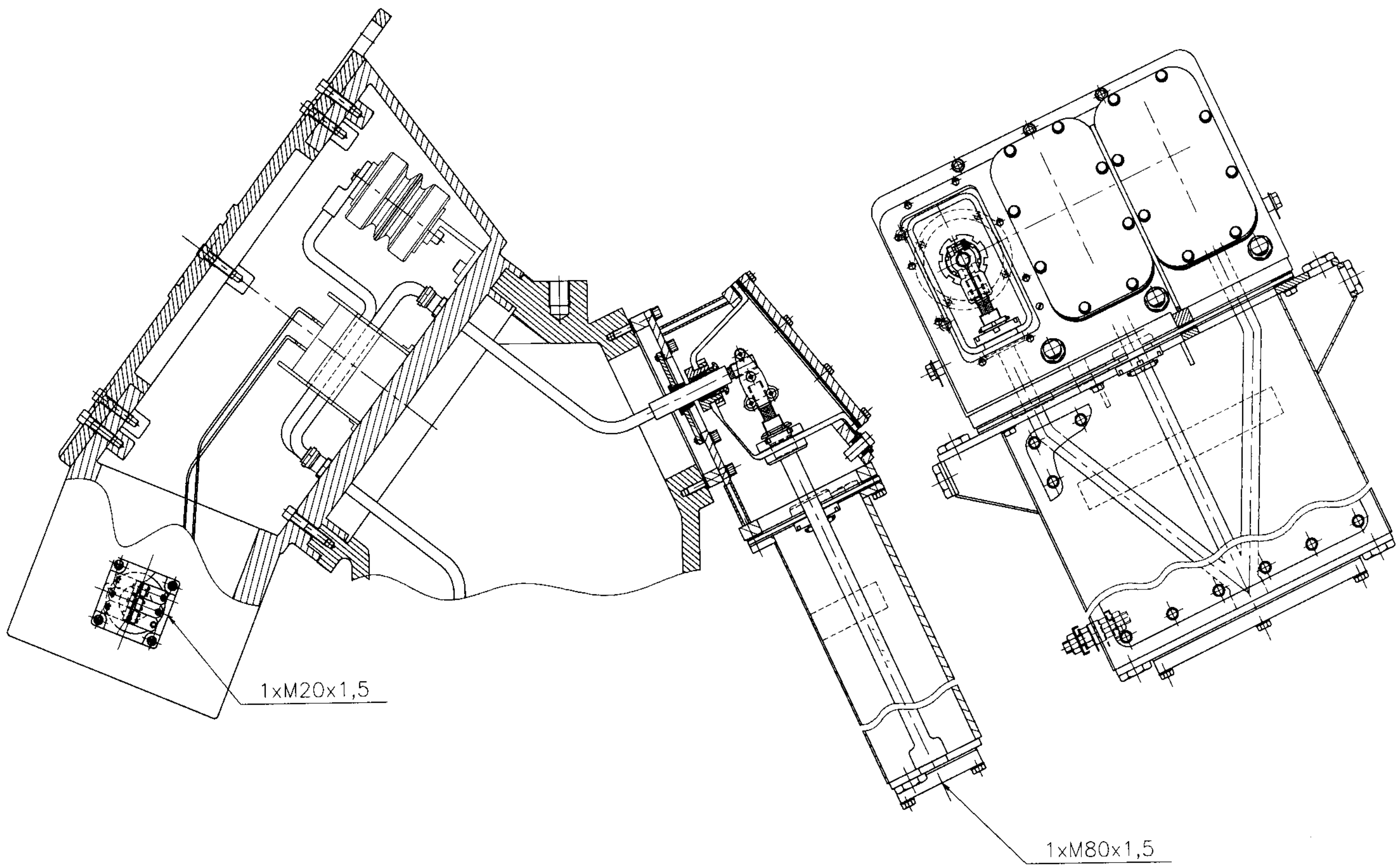
NIOEC DWG No.: 2260-PO-PM-2-1-0101-6-DW-1795 | SIZE: A4 | REV.: 01 | SCALE:

1. Approved (Released for Manufacturing)
2. Approved as Noted for Fabrication (Fabrication may Proceed)
3. Approved as Noted for Re-issue (Fabrication shall not Proceed)
4. Rejected
5. Not Returned

Comments :

Date : 15.10.08 Sign : André Rodrigues

FILE REF.:
STATUS: P.O.I.: P.O.D.:



GENERAL NOTES

REFERENCE DRAWINGS	DWG NO.

KEY PLAN

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
02	25/01/10	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
01	08.04.09	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
00	15.10.08	For approval	Pedro M.	Pedro M.	L. Araújo	

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL
ENGINEERING & CONSTRUCTION CO.
SHAZAND ARAK REFINERY EXPANSION
AND UPGRADING PROJECT
NIOEC

CONTRACTOR:
SAZEH CONSULTANTS
Oil Design & Construction Co.
SE

DRAWING TITLE:
POWER TERMINAL BOX
ASSEMBLY DETAIL

OEC Code : 8350	Unit : 13
Vendor Job No.: CE 300280	Vendor Doc No.: 83284_CTBOX
Item No.: P-1301 A/B/C-M	Designation : Feed Pump
NIOEC PROJ No.: 2260	Requisition No.: 2260-IR-PM-2-1-0101-0

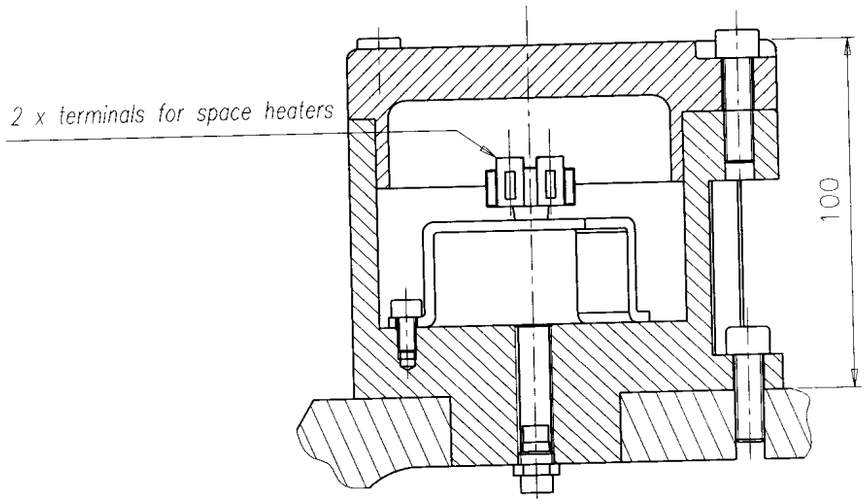
NIOEC DWG No.: 2260-PO-PM-21-0101-6-DW-179-4/5 | SIZE: A2 | REV.: 02 | SCALE: 1/5

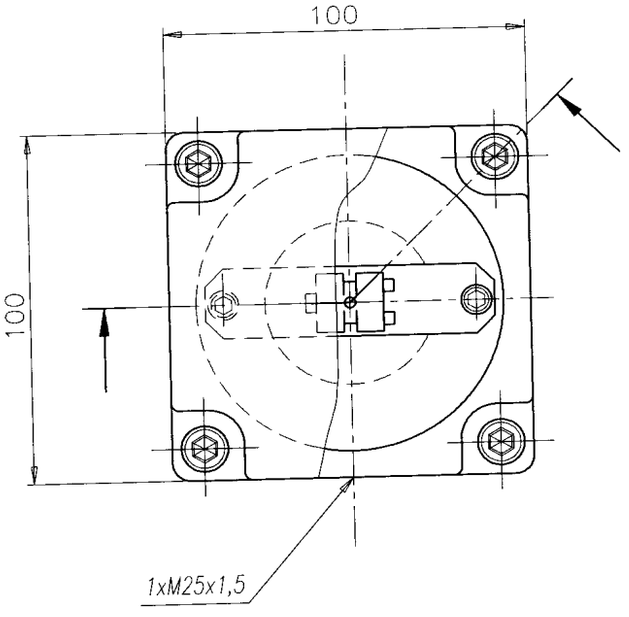
1. Approved (Released for Manufacturing)
2. Approved as Noted for Fabrication (Fabrication may Proceed)
3. Approved as Noted for Re-issue (Fabrication shall not Proceed)
4. Rejected
5. Not Returned

Comments :

Date : 15.10.2008 Sign : Pedro M.

FILE REF.:
STATUS: P.O.I.: P.O.D.:





DRAWING TITLE:

Auxiliary terminal box - CG 47

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY

NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION CO.

SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT

NIOEC

CONTRACTOR:

SAZEH CONSULTANTS

Oil Design & Construction Co.

SEI

OEC Code : 8350	Unit : 13
Vendor Job No.: CE 300290	Vendor Doc No.: 83284_HTBOX
Item No.: P-1301 A/B/C-M	Designation : Feed Pump
NIOEC PROJ No.: 2260	Requisition No.: 2260-IR-PM-2-1-0101-0

NIOEC DWG No.: 2260-PO-PM-2-1-0-1-0-1-6-D-W-1-7-9-5-3

SIZE: A4 | REV.: 02 | SCALE: 1/2

1. Approved (Released for Manufacturing)
2. Approved as Noted for Fabrication (Fabrication may Proceed)
3. Approved as Noted for Re-issue (Fabrication shall not Proceed)
4. Rejected
5. Not Returned

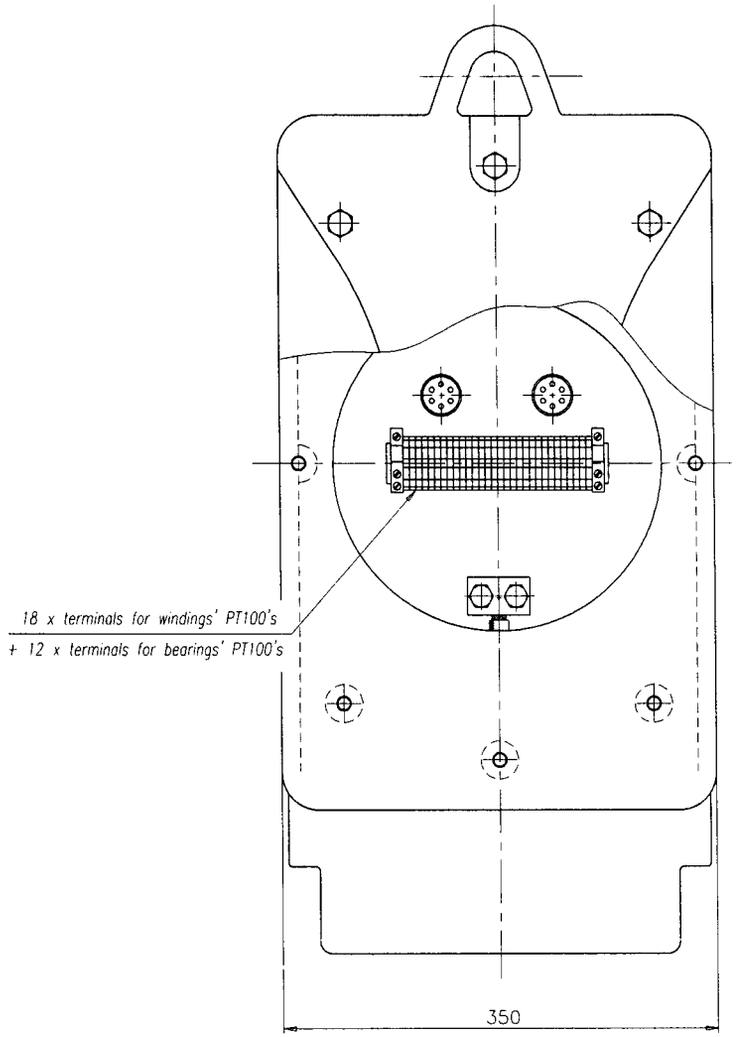
Date : 15.10.2008 Sign : F.Augusto

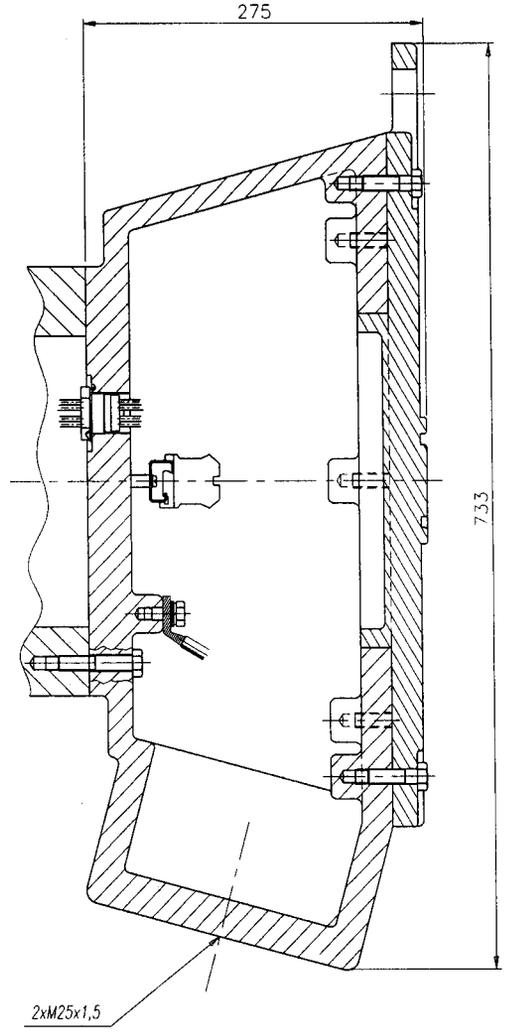
Comments :

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
02	25/01/10	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
01	08.04.09	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
00	15.10.08	For approval	F.Augusto	F.Augusto	L. Araújo	

FILE REF.:

STATUS: P.O.:: P.O.D.:





GENERAL NOTES

1-

REFERENCE DRAWINGS	DWG No.

KEY PLAN

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
02	25/01/10	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
01	08.04.09	Revised by vendor	Gabriel C.	Gabriel C.	L. Araújo	
00	15.10.08	For approval	F.Augusto	F.Augusto	L. Araújo	

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL
ENGINEERING & CONSTRUCTION CO.
SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT
NIOEC

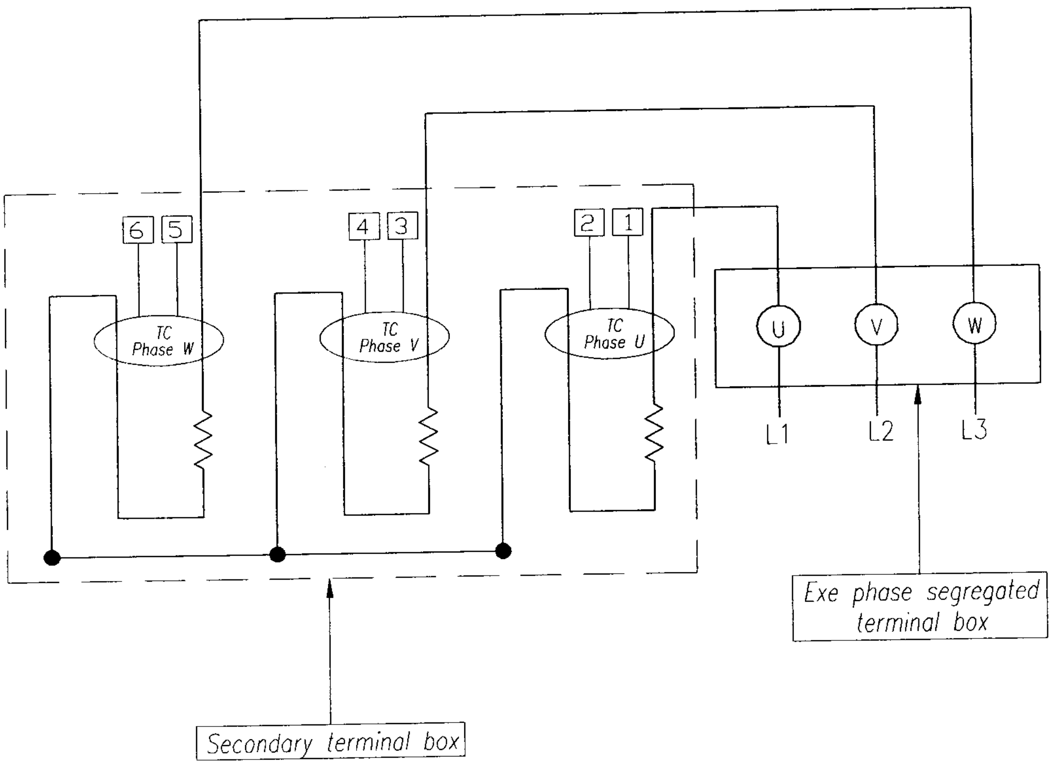
CONTRACTOR:
SAZEH CONSULTANTS
Oil Design & Construction Co.
SEPIDAR ENGINEERING & CONSTRUCTION CO.

DRAWING TITLE:
Auxiliary terminal box - CEFGH 340

OEC Code : 8350	Unit : 13
Vendor Job No. : CE 300290	Vendor Doc No. : 83284_PTBOX
Item No. : P-1301 A/B/C-M	Designation : Feed Pump
NIOEC PROJ No. : 2280	Requisition No. : 2260-IR-PM-2-1-0101-0
NIOEC DWG No. : 2260-PO-PM-2-1-0101-6-DW-179-01	SIZE: A3 REV: 0 SCALE: 1/4

1. Approved (Released for Manufacturing)	Comments :
2. Approved as Noted for Fabrication (Fabrication may Proceed)	
3. Approved as Noted for Re-Issue (Fabrication shall not Proceed)	
4. Rejected	
5. Not Returned	
Date : 15.10.2008	Sign : F.Augusto

FILE REF.: P.O.D.:
STATUS: P.O.D.:



When supplied in the indicated phase sequence, motor runs in CW direction (when viewed from drive end side)
To reverse rotation two phase sequence must be changed.
Always verify motor sense of rotation in the arrow plate, placed in the motor.

DRAWING TITLE: Secondary terminals schematic

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION CO.
SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT
NIOEC

OEC Code : 8350	Unit : 13
Vendor Job No.: CE 300 290	Vendor Doc No.: 83284_MPD
Item No.: P-1301 A/B/C-M	Designation : (Equipment Service,if Applicable) Feed Pump
NIOEC PROJ No.: 2260	Requisition No.: 2260-IR-PM-2-1-0101-0

NIOEC DWG No.: 2260-PO-PM-2-1-0101-6-DW-179-7/9 SIZE: A4 REV: 01 SCALE:

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
01	28.01.10	Revised by vendor	I.Seco	R.Rodrigues		
	15.10.2008	Issue after order	Gabriel C.	M.Lima		

CONTRACTOR: SAZEH CONSULTANTS; Oil Design & Construction Co.; SEI

1 Approved (Released for Manufacturing)
2 Approved as Noted for Fabrication (Fabrication may Proceed)
3 Approved as Noted for Re-Issue (Fabrication shall not Proceed)
4 Rejected
5 Not Returned

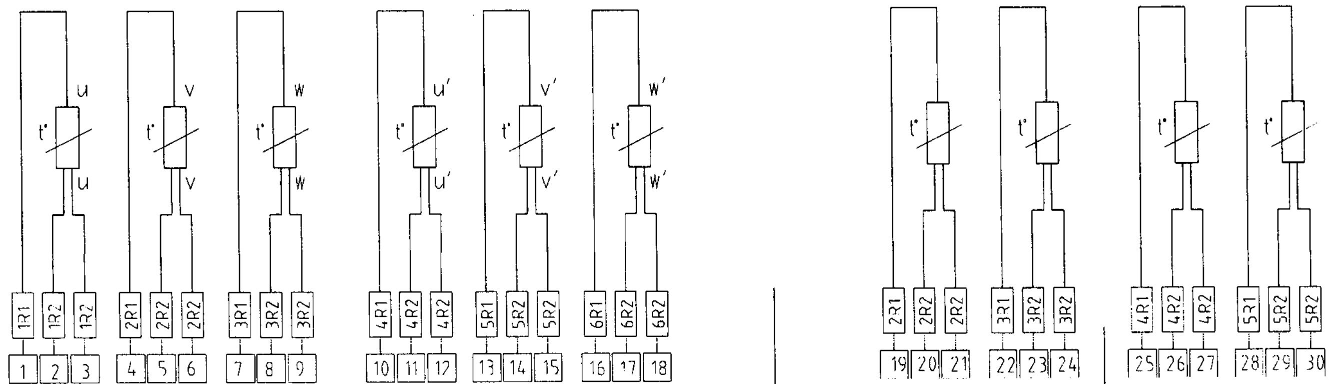
Comments :

Date : 15.10.2008 Sign : F.Augusto

FILE REF.:
STATUS: P.O.I.: P.O.D

Esquema / Scheme nº 2155

CAIXA TERM. DE PROTECÇÕES / BOÎTE AUXILIAIRE / AUXILIARY TERM.BOX



Pt100 2 / Fase - 3 fios
Sonde Pt100 2 / Phase - 3 fils
RTD's Pt100 2 / Phase - 3 wires

L.A./C.A./D.E.

L.O.A./C.O.A./N.D.E.

Pt100 2 / Rolamentos - 3 fios
Sonde Pt100 2 / Roulements - 3 fils
RTD's Pt100 2 / Bearings - 3 wires

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
01	28.01.10	Revised by vendor	I.Seco	R.Rodrigues		
00	15.10.08	Issue after order	M. Lima	M. Lima		

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL
ENGINEERING & CONSTRUCTION CO.
SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT
NIOEC

CONTRACTOR: SAZEH — Oil Design & Construction Co. — SE

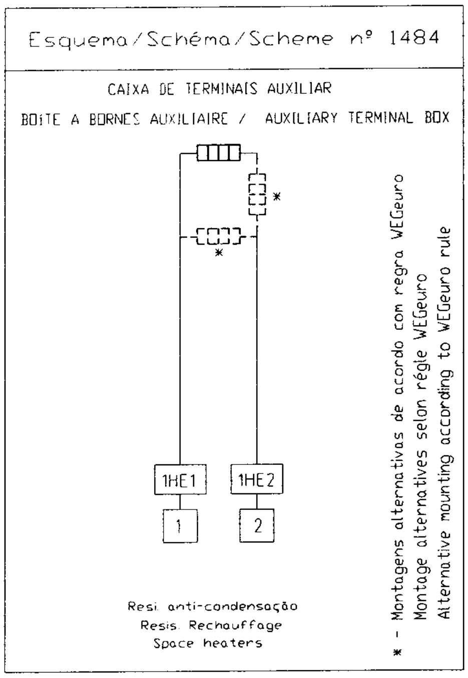
OEC Code: 8350 — Unit: 13
Vendor Job No: CE 300290 — Vendor Doc. No.: 83284_MAO
Item No: P-1301 A/B-M — NIOEC PROJ No.: 2260
Designation: Feed Pump — Requisition No.: 2260-IR-PM-2-1-0101-0
DRAWING TITLE: Auxiliary connection diagram RTD's

WEG

NIOEC DWG No.: 2260-PO-PM-21-0101-6-DW-179-B — SIZE: A4 — REV.: 01 — SCALE

1 Approved (Released for Manufacturing)
2 Approved as Noted for Fabrication (Fabrication may Proceed)
3 Approved as Noted for Re-Issue (Fabrication shall not Proceed)
4 Rejected
5 Not Returned
Date: Sign: Comments:

FILE REF.: P.O.I.: F.O.C.: STATUS:



DRAWING TITLE:

Auxiliary connection diagram

REV.	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D	AC
01	28.01.10	Revised by vendor	I.Seco	R.Rodrigues		
00	15.10.08	Issue after order	M.Lima	M.Lima		

NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY

NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION CO.

SHAZAND ARAK REFINERY EXPANSION AND UPGRADING PROJECT

NIOEC

CONTRACTOR:

SAZEH CONSULTANTS — Oil Design & Construction Co. — SE

OEC Code : 8350	Unit : 13
Vendor Job No.: CE 300290	Vendor Doc No.: 83284_MAD
Item No.: P-1301 A/B-M	Designation : (Equipment Service, if Applicable) Feed Pump
NIOEC PROJ No. 2260	Requisition No.: 2260-IR-PM-2-1-0101-0

NIOEC DWG No.: 2260-PO-PM-21-0101-6-DW-179-9/9 — SIZE: A4 — REV.: 01 — SCALE: –

- 1 Approved (Released for Manufacturing)
- 2 Approved as Noted for Fabrication (Fabrication may Proceed)
- 3 Approved as Noted for Re-issue (Fabrication shall not Proceed)
- 4 Rejected
- 5 Not Returned

Date : 15.10.2008 — Sign : M. Lima

Comments :

FILE REF.:

STATUS: P.O.I. P.O.D

Item	Designação	Material	Norma	Quant.	Plano	Massa (Kg)	Observações

Dimensões em mm

Cotas nao toleranciadas – Respeitar quando aplicável ao desenho

ISO 2768-1/89 – Aplicável para Maquinagem / Aplicável para Construção Soldada

MEDIO	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4	±6	±8
ATÉ	3	6	30	120	315	1000	2000	400	1000	2000	4000	8000
MAIS DE	0.5	3	6	30	120	315	1000	0	400	1000	2000	4000

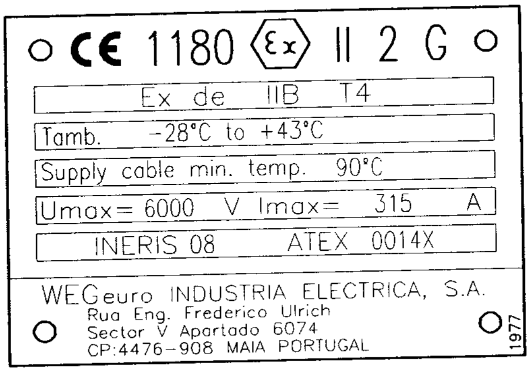
Aplicável a peças fundidas

Consultar caderno de encargos EDM 12.01.01

A

B

C



D

E

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DEPARTAMENTO	EPAP	EIEP	VDFE	ADCC	DSQA	DSLA	DSCO	PRES	PRUS	PRMO1	PRMO2	PRMT	PRBT
Nº CÓPIAS	1	1			1	1	1				1		

Rev	Data	Desenhou	Verificou	Aprovou	Alterações	Processo

MODIFICAÇÕES

Processo		Des.	01.02.2010	E. Frazão	TIPO DE MOTOR	WEGeuro-Industria Electrica,S.A.
		Verif.	01.02.2010	Ricardo R.	W22XBE 500	Rua Eng. Frederico Ulrich Sector V Apartado 6074-CP4476 908 MAIA-Portugal Contribuinte (VAT)PT506 177 521
weg		Aprov.				Rev.
		Escalas 1/1	Certification Nameplate			CE 300290/07
		Norma				Substitui:
						Substituido por:

F

1 2 3 4 IMRA41112B

SAZEH ENGINEERING CO. / شرکت طراحی و ساختمان سازه / SEI SINOPEC ENGINEERING INCORPORATION	Shazand Arak Refinery Expansion and Upgrading Project	NIOEC
	Motor Curves for item P-1301 A/B/C	
Originator Project No. :		Project No : 2260
Document No. : PM-2-1-0101-6-MC-004		Page 1 of 2

Motor Curves for item P-1301 A/B/C

File Ref. : R:\GESTIONE COMMESSE\Commesse\Arak\Iran\08C100\Cover\MCU\083284_MCU.doc

Rev.	Description	Date	Prepared	Checked	Approved	AC
00	Issued for Approval	05/11/09	U.T.	M.C.	M.C.	

X	1-Approved (Released for Manufacturing)	OEC Code : 8350	Unit : U13	WEIR GABBIONETA
	2-Approved as Noted for Fabrication (Fabrication may Proceed)	Vendor Job No. : 08C100	Item No. : P-1301 A/B/C	
	3-Approved as Noted for Re-Issue (Fabrication shall not Proceed)	Designation (Eq. Service,if applicable) : Feed pumps		
	4-Rejected	Vendor Doc. No. : 083284_MCU		
	5-Not Returned	Requisiton No. : 2260-IR-PM-2-1-0101-0		
Date : 2. Dec.09 Sign		POD:	POI:	Status:

STARTING CURVE

Customer: WEIR GABBIONETA
Plant Location: ARAK Refinery Expansion Project
Service:
Item No: P-1301 A/B/C

Manufacturer : WEGEURO, INDÚSTRIA ELÉCTRICA S.A

Model : W22XBE 500KH 2

Voltage : 6000 V

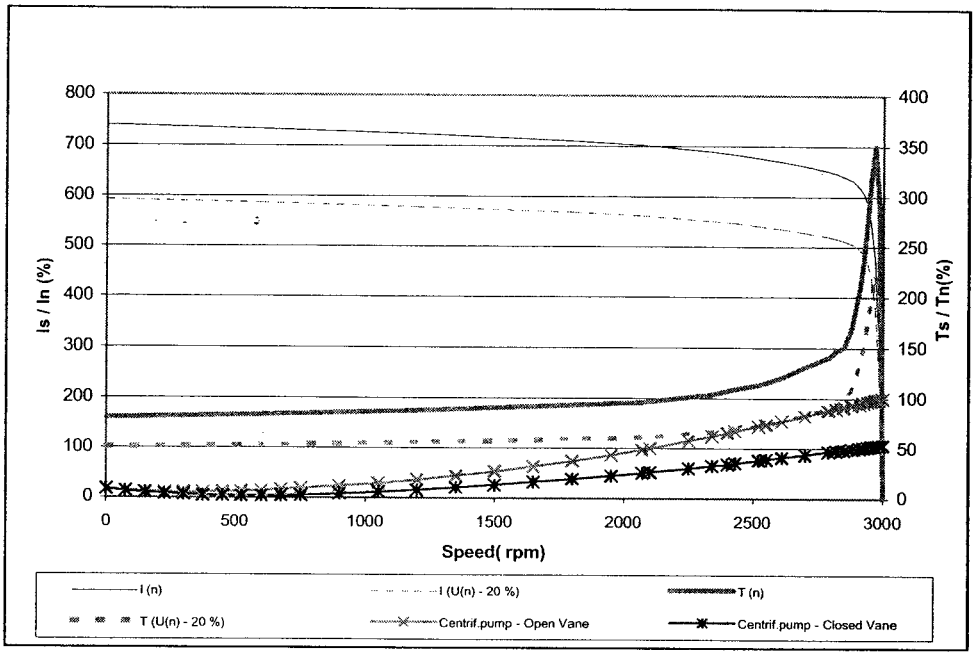
Speed : 3000rpm

Power output nominal : 1120KW

Frequency : 50 Hz

WEG order : CE 300290/ 07

Torque and Current Speed Curve	Date:	15-10-08
	ID	C 300290/07



Client	:	WEIR GABBIONETA
Motor	:	W22XBE 500KH2

Power	:	1120 kW	Duty Cicle	:	S1
Frame	:	500KH	Service Factor	:	1
Rated Speed	:	2990 rpm	Design (Torque)	:	N
Frequency	:	50 Hz	Encloser	:	IP55
Rated Voltage	:	6000 V	Ts / Tn	:	0.8
Insulation Class	:	F	Tmin / Tn	:	0.8
Rated Current	:	120.8 A	Tmax / Tn	:	3.5
Is / In	:	7.4	Motor inertia	:	53.1

Notes:

Ex de IIB T4
P-1301 A/B/C

The indicated values are within permissible tolerances under IEC 60034-1.

Performed by: Margarida Lima