

IGS-M-CH-026(0)

1375

Approved

مصوب



شرکت ملی گاز ایران

مدیریت پژوهش و فناوری

امور تدوین استانداردها

IGS

مشخصات فنی خرید

موادبازدارنده خوردگی سیستم های خنک کننده

Inhibiting Package for Cooling Water System

## **FOREWORD**

This standard is intended to be mainly used by **NIGC** and contractors and has been prepared on interpretation of recognized standards , technical documents , knowledge ,backgrounds and experiences in gas industries at national and international levels.

Iranian Gas Standards (**IGS**) are prepared , reviewed and ammended by technical standard committees within NIGC Standardization Div. and submitted to the **NIGC's "STANDARDS COUNCIL"** for approval .

**IGS** Standards are subject to revision , amendment or withdrawal , if required , thus the latest edition of **IGS** shall be checked/inquired by **NIGC** users .

This standard must not be modified or altered by the end users within **NIGC** and her contractors. Any deviation from normative references and/or well known manufacturers specifications must be reported to Standardization div.

Any comments from concerned parties on **NIGC** distributed **IGS** are welcome to technical standards committees and will receive serious attention and consideration should a revision to standards is recommended .

## **GENERAL DEFINITIONS :**

Throughout this standard the following definitions , where applicable , should be followed :

1- "**STANDARDIZATION DIV.**" has been organized to deal with all aspects of industrial standards in NIGC . Therefore , all queries for clarification or amendments are requested to be directed to the mentioned div.

2- "**COMPANY** " : refers to national iranian gas company .

3- "**SUPLIER**" : refers to a firm who will supply the service , equipment or material to igs specification whether as the prime producer or manufacturer or a trading firm .

4- "**SHALL**" : is used where a provision is mandatory.

5- "**SHOULD**" : is used where a provision is advised only.

6- "**MAY**" : is used where a provision is completely discretionary.

---

Website : <http://igs.nigc.ir>

E-mail : [nigcigs@nigc.org](mailto:nigcigs@nigc.org)

## پیشگفتار

- ۱- این استاندارد/دستورالعمل بمنظور استفاده اختصاصی در شرکت ملی گاز ایران و شرکتهای فرعی وابسته تهیه شده است.
- ۲- شرکت ملی گاز ایران در مورد نیازهای عمومی از استانداردهای وزارت نفت (IPS) و در مورد نیازهای اختصاصی از استانداردهای اختصاصی خود (IGS) استفاده می نماید.
- ۳- استانداردهای شرکت ملی گاز ایران (IGS) توسط کمیته های تخصصی استاندارد متشکل از کارشناسان بخش های مختلف و یا مشاور تهیه می شود و توسط شورای استاندارد (منتخب هیئت مدیره شرکت ملی گاز ایران) به تصویب میرسند.
- ۴- در تنظیم متن استانداردهای (IGS) از کلیه منابع شناخته شده استاندارد، اطلاعات فنی - تخصصی مربوط به صنایع گاز دنیا، مشخصات فنی تولیدات سازندگان معتبر جهانی و نیز از نتیجه تحقیقات و تجربیات کارشناسان و متخصصان داخلی بر حسب مورد استفاده می شود. همچنین بمنظور استفاده هر چه بیشتر از تولیدات داخلی قابلیت های سازندگان داخلی نیز مورد توجه قرار میگیرد.
- ۵- استانداردها از طریق پایگاه اینترنتی شرکت \* و یالوح فشرده (CD) در اختیار واحدها و کاربران قرار می گیرد .
- ۶- استانداردها بطور متوسط هر ۵ سال یکبار و یادر صورت ضرورت زودتر، مورد بازنگری و بروزرسانی قرار میگیرند. بنابراین کاربران باید همیشه آخرین نگارش را مورد استفاده قرار دهند.
- ۷- هرگونه نظر و یا پیشنهاد اصلاح در مورد استانداردها مورد استقبال و بررسی قرار خواهد گرفت و در صورت تأیید، استاندارد مربوطه نیز مورد تجدیدنظر قرار خواهد گرفت .

## تعاریف عمومی

در متن استانداردهای (IGS) از تعاریف و اصطلاحات زیر استفاده میشود.

- ۱- "شرکت" (COMPANY): منظور از شرکت "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۲- "فروشنده" (SUPPLIER/VENDOR): به فرد یا موسسه ای اطلاق میگردد که تعهدی رانسبت به شرکت تقبل نموده است.
- ۳- "خریدار" (PURCHASER): منظور از خریدار "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۴- "SHALL": در مواردی بکاربرده میشود که انجام خواسته مورد نظر اجباری است
- ۵- "SHOULD": در مواردی بکاربرده میشود که انجام خواسته مورد نظر ترجیحی و درعین حال اختیاری است
- ۶- "MAY": در مواردی بکاربرده میشود که انجام کار به شکل مورد بحث نیز قابل قبول میباشد

## IGS-MS-CH-026(0) : 1999 INHIBITORS

شرکت ملی گاز ایران امور پژوهش و استانداردهای صنعتی	
مورخ : ۱۳۷۳/۱۱/۲۶	کمیته فنی استاندارد : شیمی
۱ - نام کالا : مواد بازدارنده خوردگی ( INHIBITORS )	
۲ - محل مصرف : سیستمهای خنک کننده پالایشگاهها و ایستگاههای تقویت فشار و غیره	
۳ - متقاضی : مدیریت بازرگانی	
۴ - نوع سفارش تامین کالا	موجودی انبار
غیر موجودی انبار	دارد
۵ - سابقه استاندارد	
ندارد	دارد
۶ - مصرف در شرکت	
شماره رمز / رمزها	دارد
ندارد	دارد
۷ - اسامی و امضاء شرکت کنندگان در کمیته فنی :	
آقای عبدالحسین بلوری زاده	۷-۱ - نماینده امور مهندسی و خدمات فنی :
آقای سید مجید ذکردی	۷-۲ - نماینده خدمات فنی و خودکفائی کالا :
آقای حسن منتظر تربتی	۷-۳ - نماینده خدمات فنی عملیات :
آقای مهران مقوم غفاری	۷-۴ - نماینده امور بازرسی ، کنترل فنی و ایمنی:
آقای منصور احمدی	۷-۵ - نماینده امور پژوهش و استانداردهای صنعتی :
خانم شهرزاد صداقت کردار	۷-۶ - نماینده امور پژوهش و استانداردهای صنعتی :
۷ - ملاحظات :	
صفحه	تاریخ تصویب کمیته عالی استاندارد ۱۳۷۵ / ۴ / ۳۱

## TABLE OF CONTENT

		PGAE
1.	SCOPE	2
2.	REFERENCES	2
3.	SYSTEM DESIGN	3
	3.1 QUALIFICATION	3
	3.2 FORMULATION CHANGES	4
	3.3 PRODUCTS	5
	3.4 WORKMANSHIP	5
	3.5 CORROSION RATE	5
	3.6 SCALE CONTROL	5
	3.7 BIOLOGICAL CORROSION CONTROL	5
	3.8 ECONOMICAL CHARACTERISTIC	6
	3.9 ACCEPTANCE OPERATIONAL TEST	6
	3.10 TECHNICAL SERVICES	6
4.	APPROVAL TESTS	7
5.	PRODUCTION TESTS	9
6.	ACCEPTANCE OPERATIONAL SAMPLES	9
7.	STORAGE LIFE AND PACKAGING	9
8.	INSPECTION	10
9.	LABELING	11
10.	TEST METHODS	12
	APPENDIX	14
	DATA SHEET	

### 1. GENERAL SCOPE

THIS STANDARD COVERS THE MINIMUM PROCEDURAL REQUIREMENT FOR APPROVING SUPPLIER'S OF CHEMICAL INHIBITING PRODUCTS USED IN COOLING WATER SYSTEM TO CONTROL ALL SORTS OF CORROSION , SCALE FORMATION , FOULING AND BIOLOGICAL ACTIVITIES .

### 2. REFERENCES

THROUGHOUT THIS STANDARD THE FOLLOWING STANDARDS AND CODES ARE REFERRED TO . THE LATEST EDITIONS OF THESE STANDARDS AND CODES THAT ARE IN EFFECT AT THE TIME OF PUBLICATION OF THIS STANDARD ( 1996 ) SHALL , TO THE EXTENT SPECIFIED , FORM PART OF THIS STANDARD . THE APPLICABILITY OF CHANGES IN STANDARDS AND CODES THAT OCCUR AFTER THE DATE OF THIS STANDARD SHALL BE MUTUALLY AGREED UPON BY THE PURCHASER AND SUPPLIER AND / OR MANUFACTURER .

API ( AMERICAN PETROLEUM INSTITUTE )

API RP 38 “ RECOMMENDED PRACTICE FOR BIOLOGICAL ANALYSIS OF SUBSURFACE INJECTION WATERS “

ASTM ( AMERICAN SOCIETY FOR TESTING AND MATERIALS )

D 3951 “ STANDARD PRACTICE FOR COMMERCIAL PACKAGING “

NACE ( NATIONAL ASSOCIATION OF CORROSION ENGINEERS )

NACE STANDARD TM-01-69 “ LABORATORY CORROSION TESTING OF METALS FOR THE PROCESS INDUSTRIES “

NACE STANDARD TM-03-74 “ LABORATORY SCREENING TESTS TO DETERMINE THE ABILITY OF SCALE INHIBITORS TO PREVENT THE PRECIPITATION OF CALCIUM SULFATE AND CALCIUM CARBONATE FROM SOLUTION . “

US FEDERAL STANDARDS

MIL – STD – 105 “ SAMPLING PROCEDURES AND TABLES FOR INSPECTION BY ATTRIBUTES “ .

### **3. SYSTEM DESIGN**

THE SUPPLIER AND/OR MANUFACTURER SHALL DESIGN AN INHIBITING PACKAGE TO BE ABLE TO INHIBIT ALL TYPES OF CORROSION AND SCALE FORMATION , BIOLOGICAL ACTIVITY AND FOULING ( IF NEEDED ) IN THE COOLING WATER SYSTEM WITH REFERENCE TO ATTACHED DATA SHEET ( APPENDIX ) . THE SUPPLIER AND/OR MANUFACTURER SHALL GIVE THE FULL DETAILS OF PROPOSED PACKAGE AND SPECIFY THE FUNCTION ( S ) OF THE PACKAGE INHIBITOR ( S ) . THE PROPOSED PACKAGE SHALL ALSO MEET THE FOLLOWING REQUIREMENTS :

#### **3.1 QUALIFICATION**

##### **3.1.1 APPROVED PRODUCTS**

THE APPROVED PRODUCTS ARE THOSE PRODUCTS WHICH THEIR APPROVAL TEST SAMPLES ( SEE 4.1 ) HAVE BEEN TESTED AND HAVE PASSED THE APPROVAL TESTS SPECIFIED HEREIN ( SEE 4 ) AND HAVE BEEN LISTED ON OR APPROVED FOR LISTING ON THE APPROVED SAMPLES .

THE SUPPLIER AND/OR MANUFACTURER OF THESE SAMPLES WILL BE KNOWN AS THE APPROVED SUPPLIER .

**3.1.2 ACCEPTED PRODUCTS**

THE ACCEPTED PRODUCTS ARE THOSE PRODUCTS WHICH HAVE PASSED THE APPROVAL TESTS AS WELL AS ACCEPTANCE OPERATIONAL TESTS ( SEE 3.9 ) .

**3.1.3 QUALIFIED PRODUCTS**

THE QUALIFIED PRODUCTS ARE THOSE ACCEPTED PRODUCTS ( INHIBITING PACKAGE ) PROPOSED WITH RESPECT TO THIS STANDARD SPECIFICATION AND MEET ALL REQUIREMENTS OF THIS STANDARD SPECIFICATION . THE SUPPLIER AND/OR MANUFACTURER OF THESE PRODUCT ( S ) WILL BE KNOWN AS THE QUALIFIED SUPPLIER ( S ) .

THE SUCCESSFUL BIDDER IS KNOWN AS THE FINAL SUPPLIER .

**3.2 FORMULATION CHANGES**

THE MATERIAL(S) SHALL BE ACCEPTED ONLY FOR THE FORMULATION FOR WHICH APPROVAL AND ACCEPTANCE OPERATIONAL TESTS ARE MADE .

ANY CHANGE IN FORMULATION , SHALL CAUSE FOR DESIGNATING THE MATERIAL AS A NEW MATERIAL WHICH SHALL NOT BE CONSIDERED ACCEPTED .

THE MANUFACTURER MAY SUBMIT THE MODIFIED MATERIAL FOR ACCEPTANCE UNDER THIS STANDARD SPECIFICATION , USING A NEW MANUFACTURER'S DESIGNATION .

**3.3 PRODUCTS**

INHIBITOR(S) SHALL BE MADE FROM SUCH MATERIALS AND BY SUCH PROCESSES AS TO ASSURE COMPLIANCE WITH THIS STANDARD SPECIFICATION .

**3.4 WORKMANSHIP**

ALL DETAILS OF WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE BEST COMMERCIAL PRACTICE COVERING THESE TYPES OF MATERIALS .

**3.5 CORROSION RATE**

THE CORROSION RATE OF THE PROPOSED INHIBITING PACKAGE SHALL NOT BE MORE THAN 0.127mmpy ( 5.0 mpy ) AS DETERMINED IN ACCORDANCE WITH SUBSECTION 10.1 .

**SCALE CONTROL**

THE PROPOSED INHIBITING PACKAGE , WITH REFERENCE TO IT'S FUNCTION , SHALL BE BEST IN PREVENTING THE PRECIPITATION OF BOTH CALCIUM SULFATE AND CALCIUM CARBONATE FROM SOLUTION WHEN TESTED IN ACCORDANCE WITH SUBSECTION 10.2 .

**3.6 BIOLOGICAL CORROSION CONTROL**

THE PROPOSED INHIBITING PACKAGE , WITH REFERENCE TO IT'S FUNCTION , SHALL BE ABLE TO CONTROL THE MICROBIAL GROWTH WITH AS LOW CONCENTRATION OF PRODUCTS AS POSSIBLE WHEN TESTED IN ACCORDANCE WITH SUBSECTION 10.3 .

**3.7 ECONOMICAL CHARACTERISTIC**

THE PROPOSED INHIBITING PACKAGE SHALL MEET THE REQUIREMENTS OF CLAUSE 3.1 AT THE LOWEST COST PER YEAR ( SEE DATA SHEET CLAUSE 3 ) . THE COST EVALUATION WILL BE MADE BY THE PURCHASER ( TECHNICAL EVALUATION SECTION / IN THIS CASE ) , WITH REFERENCE TO THE PERFORMANCE OF THE PRODUCT ( S ) ( SEE 3.1 ) , INCLUDING COST OF PRODUCT ( S ) PER YEAR AND SURPLUS COSTS SUCH AS COST FOR SHIPMENT , STORAGE , OPERATION AND SO ON .

**3.8 ACCEPTANCE OPERATIONAL TEST**



A 90 – DAY CONTINUOUS OPERATIONAL TESTS WILL BE PERFORMED ON APPROVED PRODUCTS ( SEE 6 ) . THE PRODUCTS SHALL PASS THE OPERATIONAL TEST .

**3.9 TECHNICAL SERVICES**

THE APPROVED SUPPLIER SHALL FURNISH FREE OF CHARGE TECHNICAL SERVICE INCLUDING PERSONNEL , DOCUMENTATION , SUBMISSION FINAL REPORTS , AND FURNISHING TESTS INSTRUMENTATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ACCEPTANCE OPERATIONAL TESTS .

THE FINAL SUPPLIER SHALL SUPPLY FREE OF CHARGE AND IN TIME ALL NECESSARY TECHNICAL SRVICES DURING OPERATION .

**4. APPROVAL TESTS**

APPROVAL TESTS ARE THOSE TESTS PERFORMED ON SAMPLES SUBMITTED FOR APPROVAL .

THE APPROVAL TESTS OF THE INHIBITOR ( S ) WILL CONSIST OF THE TESTS OF THIS STANDARD SPECIFICATION ( SEE 10 ) .

**4.1 APPROVAL TEST SAMPLES**

4.1.1 APPROVAL TEST SAMPLES SHALL CONSIST OF SUFFICIENT AMOUNT OF ALL MATERIAL(S) PROPOSED AS AN INHIBITING PACKAGE FURNISHED UNDER THIS STANDARD SPECIFICATION . SAMPLES SHALL BE FORWARDED TO THE PURCHASER . SAMPLES SHALL BE PLAINLY IDENTIFIED BY SECURELY ATTACHED DURABLE TAGE MARKED WITH THE FOLLOWING INFORMATION :

- BRAND NAME
- SAMPLE FOR QUALIFICATION TESTS
- NAME OF MANUFACTURER ( PLANT WHERE INHIBITOR IS MANUFACTURED )
- DESCRIPTION AND FUNCTION ( S )
- MATERIAL DESIGNATION
- DATE OF MANUFACTURE

**4.1.2 THE SUPPLIER AND/OR MANUFACTURER SHALL ALSO PROVIDE THE OPERATIONAL INFORMATION WITH EACH SAMPLE AS FOLLOWS :**

- **BASE OF INHIBITOR(S)**
- **ANALYTICAL CONTROL**
- **DOSAGE IN “ COST/YEAR “ WITH REFERENCE TO THIS STANDARD SPECIFICATION ( SEE DATA SHEET )**
- **OPERATIONAL INSTRUCTION**
- **LOCATION OF FEEDING**
- **TYPE OF INJECTION SYSTEM**
- **HANDLING**
- **PACKAGING**
- **STORAGE**
- **SHELFLIFE**

**4.1.3 THE MANUFACTURER SHALL SPECIFY PHYSICAL PROPERTIES FOR THE MATERIALS COVERING THE FOLLOWINGS :**

- **PH**
- **COLOR**
- **ODOUR**
- **POUR POINT**
- **FLASH POINT**
- **VISCOSITY AT 20°C**
- **SPECIFIC GRAVITY**
- **DENSITY AT 20°C**
- **SOLUBILITY IN WATER AT 20°C**
- **BOD ( FIVE DAYS )(IF THE INHIBITOR IS USED AS A “ BIO-DISPERSANT “)**
- **OTHERS**

## **5. PRODUCTION TESTS**

**PRODUCTION TESTS ARE THOSE TESTS NORMALLY PERFORMED BY THE MANUFACTURER ON SAMPLES TAKEN FROM PRODUCTION RUN DURING THE PRODUCTION OF INHIBITOR(S).**

THE MANUFACTURER SHALL SPECIFY THE PRODUCTION TESTS .

**5.1 AFFIDAVIT OF COMPLIANCE**

THE MANUFACTURER SHALL PROVIDE AND AFFIDAVIT OF COMPLIANCE STATING THAT THE SYSTEM INHIBITOR ( S ) FURNISHED COMPLIES WITH THIS STANDARD SPECIFICATION .

**6. ACCEPTANCE OPERATIONAL SAMPLES**

THE APPROVED SUPPLIER WHICH THEIR PRODUCTS MEET SUBCLAUSE 3.8 WILL BE REQUESTED TO SUPPLY SUFFICIENT AMOUNT OF APPROVED PRODUCT ( S ) FOR A 90 DAYS PERIOD OF ACCEPTANCE OPERATIONAL TESTS .

**7. STORAGE LIFE AND PACKAGING**

**7.1 STORAGE LIFE**

THE INHIBITOR ( S ) SHALL MEET ALL REQUIREMENTS OF THIS STANDARD SPECIFICATION AFTER STORAGE FOR 24 MONTHS FROM THE DATE OF DELIVERY IN ORIGINAL CONTAINERS AT AMBIENT TEMPERATURE .

**7.2 PACKAGING**

THE MATERIAL ( S ) SHALL BE SUITABLY PACKED IN APPROVED CONTAINERS AND PROTECTED AGAINST ALL DAMAGES OR DEFECTS WHICH MAY OCCUR DURING HANDLING AND SHIPMENT TO SITE .

THE PACKAGING SHALL ALSO MEET THE RELEVANT REQUIREMENTS OF ASTM D 3951 .

**7.3 COMPATIBILITY WITH CONTAINER MATERIAL**

THE INHIBITOR ( S ) SHALL BE COMPATIBLE WITH CONTAINER MATERIAL TO THE EXTENT THAT IT SHALL NOT CAUSE DELAMINATION , SWELLING , EMBRITTLEMENT , DISSOLUTION , OR OTHER DETERIORATION SUCH AS TO IMPAIR THE USEFULNESS OF THE CONTAINER MATERIAL .

**8. INSPECTION**

THE MANUFACTURER IS RESPONSIBLE FOR THE CHARGE AND PERFORMANCE OF ALL INSPECTION REQUIREMENTS AND TESTS ( SEE 10 ) PRIOR TO SUBMISSION OF PRODUCTS FOR PURCHASER INSPECTION AND ACCEPTANCE .

EXCEPT AS OTHERWISE SPECIFIED BY THE PURCHASER , THE MANUFACTURER MAY UTILIZE HIS OWN FACILITIES OR ANY COMMERCIAL LABORATORY

ACCEPTABLE TO THE PURCHASER . INSPECTION RECORDS OF THE EXAMINATIONS AND TESTS SHALL BE KEPT COMPLETE AND AVAILABLE TO THE PURCHASER . THE PURCHASER RESERVES THE RIGHT TO PERFORM ANY OF THE INSPECTIONS SET FORTH IN THE STANDARD SPECIFICATION WHERE SUCH INSPECTIONS ARE DEEMED NECESSARY TO ASSURE SUPPLIES AND SERVICES CONFORM TO PRESCRIBED REQUIREMENTS .

**8.1 INSPECTION LOT**

AN INSPECTION LOT SHALL CONSIST OF A BATCH OF INHIBITOR(S) MANUFACTURED FROM THE SAME COMPONENTS , PROCESSED AT THE SAME TIME , AND OFFERED FOR INSPECTION AT ONE TIME .

**8.2 TEST SAMPLE**

A SUFFICIENT AMOUNT OF SAMPLE SHALL BE SELECTED AT RANDOM FROM EACH INSPECTION LOT . IF THE SAMPLE FAILS ONE OR MORE TESTS THE LOT SHALL BE REJECTED .

**8.3 SAMPLING FOR VISUAL INSPECTION**

A RANDOM SAMPLE OF FILLED CONTAINERS SHALL BE SELECTED FROM EACH INSPECTION LOT BY THE PURCHASER'S INSPECTOR IN ACCORDANCE WITH STANDARD MIL - STD - 105 AT INSPECTION LEVEL I AND ( AQL ) 2.5 PERCENT DEFECTIVE TO VERIFY CONFORMANCE TO ALL REQUIREMENTS OF THIS STANDARD SPECIFICATION REGARDING FILL , CLOSURE AND MARKING .

**8.4 INSPECTION OF PREPARATION FOR DELIVERY**

THE PACKAGING , PACKING , AND MARKING OF THE PRODUCT ( S ) SHALL BE INSPECTED TO DETERMINE CONFORMANCE TO THE REQUIREMENTS OF CLAUSES 7 AND 9 OF THIS STANDARD SPECIFICATION .

**9. LABELING**

**9.1 MARKING OF CONTAINERS**

EACH CONTAINERS SHALL BE LEGIBLY MARKED WITH THE FOLLOWING INFORMATION :

MANUFACTURER NAME AND ADDRESS

PURCHASER NAME AND ADDRESS

**STANDARD SPECIFICATION : ( IGS – MS – CH – 026 – 1375 )**

**MESC NO.**

**BASE OF INHIBITOR**

**APPLICATION : WATER TREATMENT FOR COOLING WATER SYSTEM**

**FUNCTION OF INHIBITOR**

**HANDLING**

**STORAGE**

**DATE OF MANUFACTURE**

**DATE OF DELIVERY**

**BATCH NUMBER**

**9.2 DIRECTION FOR USE**

**MANUFACTURER SHALL SUPPLY COMPLETE INSTRUCTIONS FOR USE COVERING DOSAGE , LOCATION OF FEEDING , TYPE OF INJECTION SYSTEM AND ANALYTICAL CONTROL THOROUGHLY .**

**9.3 PRECAUTIONARY MARKINGS**

**ALL INDIVIDUAL CONTAINERS SHALL BE MARKED WITH THE DIRECTION FOR SAFETY .**

**10. TEST METHODS**

**THE TESTING OF THE INHIBITOR(S) SHALL BE PERFORMED AS FOLLOW :**

**10.1 THE CORROSION RATE SHALL BE DETERMINED ACCORDING TO “ NACE STANDARD TM – 01 – 69 “ ( 1976 REVISION ) USING EITHER RAW WATER TAKEN DIRECTLY FROM THE PLANT OR TEST SOLUTIONS PREPARED FROM STANDARD CHEMICALS RECOMMENDED BY THE TEST METHOD .**

**10.2 THE ABILITY OF SCALE INHIBITOR ( S ) TO PREVENT THE PRECIPITATION OF CALCIUM SULFATE AND CALCIUM CARBONATE SHALL BE DETERMINED IN ACCORDANCE WITH “ NACE STANDARD TM – 03 – 74 “ .**

**10.3 THE BIOLOGICAL ANALYSIS SHALL BE PERFORMED IN ACCORDANCE WITH “ API RP 38 “ .**

**DATA SHEET  
“COOLING WATER SYSTEM”**

1. TYPE OF SYSTEM :  
 OPEN RECIRCULATING SYSTEM  
 ONCE – THROUGH SYSTEM  
 CLOSED RECIRCULATING SYSTEM
2. MAKE UP SOURCE / ANALYSIS / CIRCULATION ANALYSIS :

ELEMENTS	UNIT	MAKE UP		CIRCULATION	
		RAW %	SOFT %		
PH	ppm-				
P ALKALINITY	ppm AS CaCO3				
M ALKALINITY	ppm AS CaCO3				
Ca HARDNESS	ppm AS CaCO3				
T HARDNESS	ppm AS CaCO3				
SILICA	ppm AS SiO2				
CHLORIDES	ppm AS NaCl				
CONDUCTANCE	MICROHMES				
TDS BY METER	ppm				
TDS BY WEIGHT	ppm				
SRB		YES	NO	YES	NO
IRON OXIDE BACTERIA		YES	NO	YES	NO

3. DESIGN DATA :

	UNIT	QUANTITY
RECIRCULATION RATE ( QC )		
EVAPORATION LOSS ( QE )		
MAKE - UP RATE		
TEMPERATURE DIFFRENTIAL ( DT )		
RETURN TEMPERATURE		
CONCENTRATION RATIO ( CR )		
BLOW DOWN RATE		

4. PRESENT TREATMENT / INJECTION TYPE :

FUNCTION	CHEMICAL	INJECTION

	YES	NO	BATCH	CONTINUOUS
SCALE INHIBITOR				
CORROSION INHIBITOR				
MINERAL DISPERSANT				
BIOCIDES				
BIOCIDES DISPERSANT				
ACID				
DEGASIFICATION				
CHLORINE*				

\* THE TYPE OF ACID AND CHLORINE MATERIALS SHALL BE SPECIFIED .

4.1 DURATION OF EXISTING TREATMENT :

5. COOLING SYSTEM MATERIALS :

FERROUS

NON – FERROUS

MIXED

OTHERS

TO BE DESCRIBED

6. EXISTING PROBLEM ( CORROSION / SCALING / FLOUING , ETC ) :

6.1 PRESENT CONDITION OF UNIT ( CLEAN , UNCLEAN , DATE OF CLEANING , CLEANING METHOD ) :

7. DRAIN OF WASTE WATER :

RIVER

SEA

OTHERS TO BE DESCRIBED

8. ENVIRONMENTAL PROBLEMS WITH REFERENCE TO HARMFULL MATERIALS SUCH AS CHROMATE :

9. FURHTER INFORMATION :