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1999

Approved

مصوب



شرکت ملی گاز ایران

مدیریت پژوهش و فناوری

امور تدوین استانداردها

IGS

مشخصات فنی خرید

مواد صافی برای سیستم شیرین سازی گاز

Filtering Material(s) for use in DEA Plant of Kangan Gas Refinery

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 .

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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.

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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

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FILTERING MATERIALS FOR USE IN DEA PLANT OF KANGAN GAS REFINERY

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1. SCOPE

THIS STANDARD SPECIFICATION GIVES THE PROCEDURE FOR PURCHASING MATERIAL (S) WHICH WILL BE USED AS FILTERING MEDIA IN FILTERING SYSTEM TO REMOVE PARTICLES LARGER THAN 1 μ FROM DEA SOLUTION IN GAS TREATING PLANTS.

2. REFERENCE

THROUGHOUT THIS STANDARD SPECIFICATION THE FOLLOWING STANDARD AND CODE ARE REFERRED TO . THE EDITION OF THIS STANDARD AND CODE THAT ARE IN EFFECTED AT THE TIME OF ISSUES OF THIS STANDARD SPECIFICATION (1999) SHALL , TO THE EXTENT SPECIFIED HEREIN , FORM PART OF THIS STANDARD SPECIFICATION . THE APPLICABILITY OF CHANGES IN THE STANDARD AND CODE THAT OCCUR AFTER THE DATE OF THIS STANDARD SPECIFICATION SHALL BE MUTUALLY AGREED UPON BY THE PURCHASER AND SUPPLIER AND/OR MANUFACTURER .

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

F 797 - 88 “ STANDARD PRACTICE FOR DETERMINING THE PERFORMANCE OF A FILTER MEDIUM EMPLOYING A MULTIPASS , CONSTANT - RATE , LIQUID TEST “

3. MATERIAL SUPPLY

THE SUPPLIER AND/OR MANUFACTURER SHALL PROVIDE FILTERING MATERIAL (S) TO MEET THE FILTERING SYSTEM DESCRIBED IN CLAUSE 4 AND TO BE ABLE TO REMOVE PARTICLES FROM POLLUTED LEAN AMINE SOLUTION USED IN GAS WASHING UNITS . THE MATERIAL (S) SHALL MEET THE REQUIREMENTS OF THIS STANDARD SPECIFICATION .

4. DESCRIPTION OF THE SYSTEM

THE FILTERING SYSTEM IS DESCRIBED AS PER APPENDIX A.

5. REQUIREMENTS

THE FILTERING MATERIAL (S) SHALL BE SUITABLE FOR THE SYSTEM REFERED TO IN CLAUSE 4 AND SHALL MEET THE REQUIREMENTS OF CLAUSES 5.1 TO 5.7 INCLUSIVE . THE MATERIAL (S) SHALL ALSO PROVIDE ACCEPTABLE PERFORMANCE AS SPECIFIED HEREIN .

5.1 DEFINITIONS

APPROVED PRODUCTS : THE APPROVED PRODUCTS ARE THOSE PRODUCTS WHOSE APPROVAL TEST SAMPLES (SEE 5.3) HAVE BEEN LABORATORY TESTED AND HAVE PASSED THE APPROVAL TEST SPECIFIED HEREIN (SEE 5.3) AND HAVE BEEN LISTED ON OR APPROVED FOR BEING LISTED AS APPROVED SAMPLES .

APPROVED SUPPLIERS : THE SUPPLIERS AND/OR MANUFACTURERS OF APPROVED PRODUCTS WILL BE KNOWN AS APPROVED SUPPLIERS .

ACCEPTED PRODUCTS : THE ACCEPTED PRODUCTS ARE THOSE PRODUCTS WHICH HAVE PASSED THE APPROVAL TEST AS WELL AS ACCEPTANCE OPERATIONAL TEST (SEE 5.4) .

QUALIFIED PRODUCTS : THE QUALIFIED PRODUCTS MEAN THE ACCEPTED PRODUCTS PROPOSED WITH RESPECT TO THIS STANDARD SPECIFICATION WHICH MEET ALL REQUIREMENTS OF THIS STANDARD SPECIFICATION .

QUALIFIED SUPPLIER (S) : THE SUPPLIER AND/OR MANUFACTURER OF QUALIFIED PRODUCTS WILL BE KNOWN AS THE QUALIFIED SUPPLIER(S) .

FINAL SUPPLIER : THE SUCCESSFUL BIDDER IS KNOWN AS THE FINAL SUPPLIER .

5.2 FORMULATION CHANGES

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

5.3 APPROVAL TEST

APPROVAL TEST IS THE LABORATORY TEST PERFORMED ON THE SAMPLES SUBMITTED FOR APPROVAL . THE PROPOSED FILTERING MATERIAL (S) SHALL BE TESTED IN ACCORDANCE WITH ASTM TEST METHOD F 797 – 88 USING INSTRUCTION OF LAYING DOWN THE BED

PROPOSED BY THE SUPPLIER AND/OR MANUFACTURER AND SHALL PASS THIS TEST .

5.3.1 APPROVAL TEST SAMPLES

5.3.1.1 APPROVAL TEST SAMPLES SHALL CONSIST OF SUFFICIENT AMOUNT OF FILTERING MATERIAL (S) PROPOSED FURNISHED UNDER THIS STANDARD SPECIFICATION . SAMPLE (S) SHALL BE FORWARDED TO THE PURCHASER . SAMPLE (S) SHALL BE PLAINLY IDENTIFIED BY SECURELY ATTACHED DURABLE TAGS OR LABELS MARKED WITH FOLLOWING INFORMATION :

- SAMPLE FOR QUALIFICATION TEST (OR APPROVAL TEST)**
- BRAND NAME**
- NAME OF MANUFACTURER (OR THE PLANT WHERE MATERIAL(S) IS (ARE) MANUFACTURED)**
- MATERIAL DESIGNATION**
- DATE OF MANUFACTURE**

5.3.1.2 THE SUPPLIER AND/OR MANUFACTURER SHALL ASLO PROVIDE THE OPERATIONAL INFORMATION WITH EACH SAMPLE AS FOLLOWS :

**BASE OF FILTERING MATERIAL (S)
OPERATIONAL AND LAYING DOWN INSTRUCTION
DESCRIPTION AND FUNCTION (S)
HANDLING
STORAGING
SHELFLIFE
OTHERS**

**5.3.1.3 THE SUPPLIER SHALL SPECIFY PHYSICAL PROPERTIES FOR THE MATERIAL (S) COVERING THE FOLLOWINGS :
CHEMICAL COMPOSITION**

SOLUBILITY

PARTICLE SIZE DISTRIBUTION

PERMEABILITY

CAKE DENSITY

MEAN PARTICLE SIZE

5.4 ACCEPTANCE OPERATIONAL TEST

A 90 – DAY CONTINUOUS OPERATIONAL TEST WILL BE PERFORMED ON APPROVED PRODUCTS (SEE 5.6) IN THE TREATING PLANT . THE PRODUCTS SHALL PASS THE OPERATIONAL TEST TO BE TAKEN AS AN ACCEPTED PRODUCTS .

5.5 ECONOMICAL ASPECTS

THE PROPOSED FILTERING MATERIAL (S) SHALL MEET THE REQUIREMENTS OF CLAUSE 5.1 AT THE LOWEST COST PER YEAR . THE COST EVALUATION WILL BE MADE BY THE PURCHASER (TECHNICAL DEPARTMENT OF END USER IN THIS CASE) WITH REFERENCE TO THE PERFORMANCE OF THE PRODUCT (S) (SEE 5.1) , INCLUDING COST OF PRODUCT (S) PER YEAR AND OTHER COSTS SUCH AS FORWARDING SHIPMENT , STORAGE , OPERATION AND SO ON .

5.6 ACCEPTANCE OPERATIONAL SAMPLES

THE APPROVED SUPPLIER WHOSE PROPOSED PRODUCTS MEET SUBCLAUSE 5.5 WILL BE REQUESTED TO SUPPLY SUFFICIENT AMOUNT OF APPROVED PRODUCT (S) FOR A CONTINUOUS 90 DAY ACCEPTANCE OPERATIONAL TEST .

5.7 QUALITY ASSURANCE

THE SUPPLIER SHALL PROVIDE A QUALITY ASSURANCE CERTIFICATE TO ENSURE THAT THE PRODUCT PROPOSED COMPLIES WITH THIS STANDARD SPECIFICATION .

6. INSPECTION AND QUALITY ASSURANCE (QA)

- 6.1 THE MANUFACTURER AND/OR SUPPLIER SHALL BE RESPONSIBLE FOR CARRYING OUT ALL THE TESTS AND QA'S REQUIRED BY THIS STANDARD SPECIFICATION (SEE 5.3.1.3) , USING HIS OWN OR OTHER RELIABLE FACILITIES , AND HE SHALL MAINTAIN COMPLETE RECORDS OF ALL SUCH TESTS AND QUALIFICATIONS . SUCH RECORDS SHALL BE AVAILABLE FOR REVIEW BY THE PURCHASER . THE MANUFACTURER AND/OR SUPPLIER SHALL FURNISH TO THE PURCHASER A CERTIFICATE OF QUALITY STATING THAT EACH LOT HAS BEEN SAMPLED , TESTED , AND QUALIFIED IN ACCORDANCE WITH THIS STANDARD SPECIFICATION AND HAS BEEN FOUND TO MEET THE REQUIREMENTS SPECIFIED .**
- 6.2 AN INSPECTION LOT SHALL CONSIST OF A BATCH (OR BATCHES) OF PRODUCTION PROCESSED FROM THE SAME MATERIAL COMPONENTS , AND OFFERED FOR INSPECTION AT ONE TIME .**
- 6.3 THE MANUFACTURER AND / OR SUPPLIER SHALL AFFORD THE PURCHASER'S INSPECTOR ALL REASONABLE FACILITIES REQUIRED FOR INSPECTION OF EACH BATCH OF PRODUCTION IN ACCORDANCE WITH THIS STANDARD SPECIFICATION . SUCH INSPECTION IN NO WAY RELIEVES THE MANUFACTURER AND/OR SUPPLIER OF HIS RESPONSIBILITIES UNDER THE TERM OF THIS STANDARD SPECIFICATION .**
- 6.4 THE PURCHASER RESERVES THE RIGHT TO PERFORM ANY INSPECTIONS SET FORTH IN THIS STANDARD SPECIFICATION WHERE SUCH INSPECTIONS ARE DEEMED NECESSARY TO ASSURE THAT SUPPLIES AND SERVICES CONFORM TO THE PRESCRIBED REQUIREMENTS .**
- 6.5 THE PURCHASER'S INSPECTOR RESERVES THE RIGHT TO HAVE ACCESS TO THE MATERIALS SUBJECT TO INSPECTION FOR THE PURPOSE OF**

WITNESSING SELECTION OF THE SAMPLES , PREPARATION OF THE TEST SAMPLES AND PERFORMANCE OF THE TEST (S) . FOR SUCH TESTS , THE INSPECTOR RESERVES THE RIGHT TO INDICATE THE SAMPLE (S) FROM WHICH THE QUANTITIES WILL BE TAKEN IN ACCORDANCE WITH THE PROVISIONS OF THIS STANDARD SPECIFICATION .

6.6 IF THE INSPECTION RESULTS OF THE SAMPLES SHOW FAILURE TO CONFORM TO THE REQUIREMENTS OF THIS STANDARD SPECIFICATION , A REINSPECTION ON THE SAME LOT MAY BE CARRIED OUT . THE RESULTS OF THE RETEST AVERAGED WITH THE RESULT OF THE INITIAL TEST .

6.7 SHOULD THE RETEST AS DESCRIBED ABOVE , FAILURE TO CONFORM TO THIS STANDARD SPECIFICATION THE LOT WILL BE DETERMINED REJECTED .

7. CERTIFICATION

THE MANUFACTURER AND/OR SUPPLIER SHALL FURNISH THE PURCHASER WITH CERTIFICATION THAT SAMPLES REPRESENTING EACH LOT HAVE BEEN EITHER TESTED OR INSPECTED AS DIRECTED IN THIS STANDARD SPECIFICATION AND THE REQUIREMENTS HAVE BEEN MET . A REPORT OF THE TEST RESULTS SHALL BE FURNISHED .

8. PACKAGING

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

9. STORAGE LIFE

THE FILTERING MATERIAL(S) SHALL MEET ALL REQUIREMENTS OF THIS STANDARD SPECIFICATION AT LEAST 24 MONTHS FROM DATE OF DELIVERY .

10. MARKING

EACH CONTAINER SHALL BE LEGIBLY MARKED AT LEAST WITH FOLLOWING INFORMATION :

MANUFACTURER'S NAME AND ADDRESS

PURCHASER'S NAME AND ADDRESS

STANDARD SPECIFICATION : (IGS-MS-CH-029-1999)

MESC NO.

HANDLING GUIDELINES

STORAGING SYMBOLS

DATE OF MANUFACTURE

BATCH NO.

“ APPENDIX A “ DATA SHEET FILTERING SYSTEM

1. PURPOSE

THE AMINE SOLUTION USED IN GAS WASHING UNITS CARRIES WASTES AND METALIC SALTS , IRON SULPHIDES , EROSION PRODUCTS AND ETC IN SUSPENSION . THE MAIN AIM IS TO REMOVE THE SUSPENDED PARTICLES BY FILTRATION .

2. FILTER CHARACTERISTICS

2.1 CONFIGURATION OF FRAMES AS ATTACHED FIGURES ON SHEET NUMBER 16 .

2.2 DIMENSIONS OF THE FILTER

- DIAMETER : 1250 mm
- LENGTH : 2155 mm
- TOTAL AREA : 40 m²
- NUMBER OF FILTERING FRAMES : 22

3. OPERATING CONDITIONS (DESIGNATED INFORMATION) :

- FLOW : 35 m³ / h
- PRESSURE : 7 bar
- TEMPERATURE : 86°C
- TERMINAL PRESSURE DROP : 3 bar

- THE MINIMUM ACCEPTABLE FILTRATION RATIO FOR PARTICLES GREATER THAN 1 MICRON (B_1) = 99

APPENDIX B
(INFORMATIVE GUIDANCE)
EXISTING OPERATION
FOR
INFORMATION AND GUIDANCE

1. CURRENT OPERATING PROCEDURE

SEE DRAWING NUMBER 7976

1.1 PRECOATING PREPARATION

1.1.1 THE CYCLE IS STARTED WITH ALL VALVES CLOSED .

1.1.2 FILLING OF PRECOAT TANK EITHER WITH DEA AT 30 PERCENT OR WITH DEMINERALIZED WATER (VALVE 14) .
(TANK CAPACITY : APPROX. 3200 LITERS)
START AGITATOR .

1.1.3 MIXING THE FILTERING MATERIAL WITH DEA (FOR MATERIAL SEE 2.1)

- OPEN VALVES 1 AND 2 .
- START PRECOAT PUMP.
THE CIRCUIT IS THUS ESTABLISHED BETWEEN PRECOAT TANK, PRECOAT PUMP AND PRECOAT TANK .
- VALVES MUST BE ENTIRELY OPEN TO PROVIDE MAXIMUM CIRCULATION SPEED .
- PRECOAT PUMP BEING STILL IN OPERATION , ADD THE PRECOAT FILTRATION ADDITIVE ON THE BASIS OF 200 g / m² UNTIL IT IS COMPLETELY DISPERSED IN THE LIQUID , i.e. IN THIS CASE 6.4 kg FOR 18 FILTERING FRAMES (32 sq. m. AREA) AND 8 kg FOR 22 FILTERING FRAMES (40 sq. m. AREA) .
- TAKE CARE THAT PIPES ARE NOT BLOCKED .
- TIME REQUIRED : 3 – 5 MINUTES .

1.1.4 PRECOATING OF FILTER

- OPEN VALVES 14,3 AND 4.
- GRADUALLY CLOSE VALVE 2 .
- WHEN PRODUCT RUNS OUT OF VALVE 14 INTO PRECOAT TANK , CLOSE VALVE 14 .
- ADJUST PUMP DISCHARGE PRESSURE TO ABOUT 0.5 bar BY ADJUSTING OPENING OF VALVE 2 TO OBVIATE EXCESSIVELY RAPID RISE OF PRESSURE AND TO CONTROL REGULAR PRECOATING .
- MAINTAIN PRESSURE , UNLESS PREVIOUS EXPERIENCE OF FILTERATION SHOWS THAT RESULTS ARE IMPROVED BY HIGHER OR LOWER PRESSURE .
- WHEN LIQUID FLOWS OUT AT THE DESIRED DEGREE OF CLARIFICATION WHICH CAN BE CHECKED BY TAKING SAMPLES FROM THE FILTERED PRODUCT CIRCUIT , FILTER IS READY . PRECOATING USUALLY REQUIRES 5 MINUTES MAX . AND THE FILTER IS READY FOR FILTERING .

1.2 FILTERATION

PRECOATING IS SATISFACTORY :

ESTABLISH THE FILTERING CIRCUIT BY CARRYING OUT THE FOLLOWING STEPS IN THE ORDER GIVEN :

PRECOAT PUMP BEING STILL IN OPERATION .

- OPEN VALVE 5 AND GRADUALLY OPEN VALVE 6 .
- CLOSE VALVES 3 AND 4 .
- STOPPE PRECOAT PUMP.
- CLOSE VALVES 1 AND 2 .

FILTRATION TAKES PLACE AND THE FILTERED LIQUID LEAVES THROUGH VALVE 5 .

1.3 CONTINUOUS ADDITION OF FILTER – AID (FOR MATERIAL SEE 2.2)

IT IS POSSIBLE TO LENGTHEN THE FILTERING CYCLE BY FEEDING A POWDER FILTER MEDIUM INTO THE FILTER INLET CONTINUOUSLY DURING FILTERATIONS .

- FILLING OF PRECOAT TANK WITH DEA (BY VALVE 4) .
- START MIXER .
- ADD THE FILTER – AID DIRECTLY INTO PRECOAT TANK FOR 10% CONCENTRATION (i.e. 300kg OF FILTER - AID FOR 3 m³).
- OPEN VALVES 16 AND 15 .
- START DOSING PUMP AND ADJUST FLOW RATE BETWEEN 20 LIT./h TO 40 LIT./h .
- DURING FILTRATION CONTROL PRECOAT TANK LEVEL . IF NECESSARY FILL PRECOAT TANK WITH DEA AND ADD FILTER – AID FOR 10% CONCENTRATION OF FILTER – AID .

1.4 END OF FILTRATION

WHEN THE DIFFERENTIAL PRESSURE OF FILTER REACHES MAX. 3 bar , IT IS ADVISABLE TO STOP FILTRATION (THE EQUIPMENT CAN TAKE UP A DIFFERENTIAL PRESSURE OF MAX. 4 bar) .

- CLOSE VALVE 15 – 16 IF NECESSARY - 6 AND 5 .
- STOP DOSING PUMP.

2. EXISTING FILTERING MATERIALS USED

2.1 PRECOAT

THE PHYSICAL PROPERTIES OF PRECOAT USED IS AS FOLLOWS :

2.1.1 COMPONENT

THE PRECOAT IS MADE OF HUNDRED PERCENT BLEACHED CELLULOSE .

2.1.2 SOLUBILITY

THE PRECOAT IS SOLUBLE IN CUPRIETHYLENDIAMINE AND INSOLUBLE IN WATER AND ALCOHL .

2.1.3 FIBER CHARACTERISTICS

AVERAGE FIBER LENGTH IS 1.3 mm WITH THE AVERAGE FIBER DIAMETER OF 15 U .

2.1.4 PARTICLE SIZE DISTRIBUTION

PARTICLE SIZE DISTRIBUTION IS AS IN TABLE 1 .

TABLE 1

SIZE , mm	CUMULATIVE WEIGHT , %
2.50	8
1.60	29
0.80	41
0.40	49
0.20	74
0.10	91
0.04	98
0.02	100

2.2 FILTER – AID

THE FILTER – AID USED HAS FOLLOWING PROPERTIES :

2.2.1 CHEMICAL COMPOSITION

THE CHEMICAL COMPOSITION FOR FILTER – AID IS ACCORDING TO TABLE 2 .

TABLE 2

COMPONENT	VALUES , %
SiO ₂	72
Al ₂ O ₃	14
Fe ₂ O ₃	0.7
Na ₂ O	4.0
K ₂ O	8.8
CaO	0.3
MgO	0.1
TiO ₂	0.1

2.2.2 PHYSICAL PROPERTIES**THE PHYSICAL PROPERTIES OF FILTER-AID IS AS IN TABLE 3 .****TABLE 3**

PROPERTIES	GRADES
PERMEABILITY , DARCY	0.9 - 1.0
CAKE DENSITY , kg / m³	240
MEAN PARTICLE SIZE , u	7.0 - 8.5