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(71) - , , . ,  
29699

(72) ,  
- 29683 20  
,  
- 29699 25  
,  
- 29683 1  
,  
- 29664 88  
,  
- 29664 17  
,  
- 29683 - - 2

(74)

:

(54) 가

( ) 가 , 가 가 (i) 가 가  
(ii) 가 가 가 가

40 % 99 %

가

(thermal flocculation point)

(wad - like)

( )

가

[Ullmann's Encyclopaedia of Industrial Chemistry, 5<sup>th</sup> Edition (1986), Volume A5, pages 461 - 488, VCH Verlagsgesellschaft, Weinheim; Methoden der organischen Chemie (Methods of Organic Chemistry), 4<sup>th</sup> Edition (1987), Volume E20, Makromolekulare Stoffe, (Macromolecular Substances) Part - Volume 3, pages 2048 - 2076, Georg Thieme Verlag Stuttgart]

EP - A 0 049 815

2

0.125 mm 가 90%가

(pinned disc mill)

(pellet press)

가

EP - A - 0 370 447

20 70 %

1 가

10 %가

EP - A - 0 384 046

20 2%

100 Pa · s

0.4 0.035 mm

EP - A - 0 835 881

30 70 %

( )

( )  
가

( )

가

, GB - A - 2 262 527

30 80 % )

- 10 60

가

, GB - A - 2 262 527 300 g/

(

270 g/

)

( 3)

WO 98/907931

35 99 % (

60 80 %)

가

57 % 0.063 mm

( 3).

가

가

가  
(en

crustation)가

가

0.1 mm

95 %  
( 1 2).

0.063 mm 90 %

가 가

;

;



(MHPHEC), (MHEC), (CMC),  
 (hmHEC), (hmHPC),  
 (hmEHEC), (hmHPHEC), (hmCMHEC),  
 (hmMHPC), (hmMC),  
 (hmCMMC), (SEC), (hmMHEC), (HESEC),  
 (HPSEC), - (MHESEC),  
 (MHPSEC), (HEHPSEC),  
 (CMSEC), (hmSEC), (hmHPSEC) (hmHE  
 SEC), (hmHEHPSEC)가 .

" DS" . DS OH -  
 " DS (M)" . " MS"  
 " MS (HP)" . " MS (ME)"

DS (M), MS (HE) MS (HP) [G. Bartelmus, R. Kellerer, Z. Anal. Chem. 286 (1977), 161 - 1  
 90] (Zeisel) p.e.

가 DS (M) 1 2.6 , MS (HE)가 0.05 0.9 D  
 S (M) 1.3 1.9 MS (HE)가 0.15 0.55 , DS (M) 1 2.6  
 MS (HP)가 0.05 1.2 MS (HE)가 0.05 0.9 ,  
 DS (M) 1.3 1.9 MS (HP)가 0.05 0.6 MS (HE)가 0.15 0.55

( ) 가

( )

가

25

50 % 가 ( )

( )

, 가

) 가 ( )  
 50 80 %, 65 78 %, 68 76 % .

a)

( ) ( )  
 40 ( 65 % )  
 가 가 가 가  
 (twin - screw compounder) 가 (axial open access)

(trough) ( IKA,  
 List). 가

가 가 (Reflector: ) 가 ( : Lipp).  
 (Stiftconvert: ) ( : Berstorff)

가 / 가 ( : Fima) 가  
 (discharge screw) (saddle) 가  
 (flow baffle) ( : Baye  
 r AG).

(planetary stirrer) (inline) 가  
 (bypass) 가

( ) b)

가  
 / 가 , 가 40 / 99 %  
 ) ( , , ) (

가  
 1 mm<sup>2</sup> 가 (breaker plate) (passing sieve (meat mincer))

( , c) 가 ( ) 가 ,  
 가 가  
 US - A - 4,747,550, DE - A - 3 811 910 EP - A - 0 775 526

가 가 가 ,  
 b) 가 , 가

(露点) 가 가 가 , ,  
 , 가 가 0 300 가 ( ) 5  
 50 , 가 가 ( ) ,  
 가 가 가 ( ) ,  
 가 , 가 ( ) 가 가 ( ) 가

1:99 60:40 , 3:97 40:60 ,  
 5:95 30:70 가 ( )  
 가 : (kg/h) = (kg/h) + 가 (kg/h) × %/100  
 0 % - MC (kg/h) × %/100 %.

: (kg/h) = (kg/h) + 가 (kg/h) × %/100  
 %.





0.063 mm 230

A40% < 0.063 mm

%

< 0.25 mm 98.5 - 100

< 0.2 mm 95 - 100

< 0.16 mm 89 - 98

< 0.125 mm 79 - 92

< 0.1 mm 65 - 80

< 0.063 mm 35 - 45

B50% < 0.063 mm

%

< 0.25 mm 99 - 100

< 0.2 mm 98 - 100

< 0.16 mm 93 - 99

< 0.125 mm 85 - 94.5

< 0.1 mm 75 - 88

< 0.063 mm 45 - 55

C60% < 0.063 mm

%

< 0.25 mm 99 - 100

< 0.2 mm 98.5 - 100

< 0.16 mm 95.5 - 100

< 0.125 mm 89 - 96.5

< 0.1 mm 81 - 91.5

< 0.063 mm 55 - 65

D70% < 0.063 mm

%

< 0.25 mm 99.5 - 100

< 0.2 mm 99.0 - 100

< 0.16 mm 97.0 - 100

< 0.125 mm 93 - 98

< 0.1 mm 86 - 94.5

< 0.063 mm 65 - 75

E80% < 0.063 mm

%

< 0.25 mm 99.9 - 100

< 0.2 mm 99.5 - 100

< 0.16 mm 97.5 - 100

< 0.125 mm 95.5 - 99.5

< 0.1 mm 91 - 97

< 0.063 mm 75 - 85

F90% < 0.063 mm

%

< 0.25 mm 99.9 - 100

< 0.2 mm 99.5 - 100

< 0.16 mm 98.5 - 100

< 0.125 mm 96.5 - 99.9

< 0.1 mm 94 - 99.5

< 0.063 mm 85 - 95

0.3 kg/ 0.15 kg/ 0.5 kg/ 0.5 kg/

< >

55 가 % DS ( ) = 1.51 , MS ( ) = 0.28 ( 25%

가 ( MT 1-3).

: (MT) : (MT)

rger Maschinen Jackering GmbH 가 (Ultra Rotor II , Altenbu (profiled counter - grinding track)  
 16 0.5 mm 7 , n , d = 0.5 m  
 U= x n x d , n 0.6  
 m 12 m<sup>2</sup> (bag filter)  
 가 가 가 가

( - ) 1 2  
 가 . ( , , ) 10 mm 가 .

/ (water jet fan)

: MT1 : MT1

) = 1.51 MS ( 25% ) = 0.28 ( DS ( )  
 / 가 , 1800 m<sup>3</sup> 가 230 250 . 114 kg /  
 130 % 가 , 73

3550 s<sup>-1</sup> , 403 g/ 가 2% 가 2  
 0 2.55 /s (Haake Rotovisko) 87,500 mPa · s MHEC 7  
 5.6 % 0.063 mm : 4.7  
 % < 15.5 μm; 2.1 % < 11 μm; 0.7 % < 5.5 μm. 2 %

: MT2 : MT2

MHEC 106 kg /  
 가 230 245 , 130 가 , 1800 m<sup>3</sup>  
 (125 ). / 71 % .

3175 s<sup>-1</sup> , 397 g/ 가 2% 가 2  
 0 2.55 /s (Haake Rotovisko) 90,200 mPa · s MHEC 6  
 6.1 % 0.063 mm : 2.3  
 % < 15.5 μm; 0.9 % < 11 μm; 0.0 % < 5.5 μm. 2 %

: MT3 : MT3

MHEC 130 kg /  
 가 250 270 , 130 가 , 1700 m<sup>3</sup>  
 (125 ). / 75 % .

2470 s<sup>-1</sup> , 395 g/ 가 2% 가 2  
 0 2.55 /s (Haake Rotovisko) 93,700 mPa · s MHEC 5  
 5.9 % 0.063 mm : 1.7  
 % < 15.5 μm; 0.6 % < 11 μm; 0.0 % < 5.5 μm. 2 %

20 2.55 /s (Haake Rotovisko) 2% [mPa · s] V2  
 %  
 MT 4 - 16 DS (M), MS (HE) MS (HP)

[ 1a]

MT 4 - 6	4	5	6
DS (M)	1.53	1.53	1.53
MS (HE)	0.28	0.28	0.28
MS (HP)	0.29	0.29	0.29
[ % ]	25	25	25
[ kg/h ]	107	115	112
[ /s ]	3550	3175	2820
T [ ]	210 - 230	220 - 240	230 - 250
T [ ]	130	130	130
125 가 [ m <sup>3</sup> /h ]	1750	1700	1700
/ [ % ]	71	73	72
< 0.25 mm < 0.2 mm < 0.16 mm < 0.125 mm < 0.1 mm < 0.063 mm	99.999.799.396.891. 971.8	99.799.296.891.08 1.255.1	98.695.289.679.165. 637.9
V2	8200	8200	8000
[ % ]	1.7	1.3	2.0
[ g/ ]	408	393	341
< 15.5 μm < 11 μm < 5.5 μm	4.52.00.6	2.00.80.1	1.00.40.0

[ 1b ]

MT 7 - 8	7	8
DS (M)	1.54	1.54
MS (HE)	0.1	0.1
MS (HP)	0.24	0.24
[ % ]	22	22
[ kg/h ]	142	140
[ /s ]	3550	2470
T [ ]	250 - 270	270 - 290
T [ ]	130	130
125 가 [ m <sup>3</sup> /h ]	1750	1650
/ [ % ]	78	77
< 0.25 mm < 0.2 mm < 0.16 mm < 0.125 mm < 0.1 mm < 0.063 mm	99.999.899.598.094.478.8	99.699.196.989.879.849.9
V2	49800	51000
[ % ]	1.8	1.5
[ g/ ]	409	414

[ 1c ]

MT 9 - 12	9	10	11	12
DS (M)	1.56	1.56	1.56	1.56
MS (HE)	0.27	0.27	0.27	0.27
[%]	25	25	25	25
[kg/h]	117	114	113	120
[ /s]	3550	3175	2820	2470
T [ ]	240 - 250	230 - 250	240 - 260	250 - 270
T [ ]	130	130	130	130
125 가 [m <sup>3</sup> /h]	1800	1800	1750	1750
/ [ %]	73	73	73	74
< 0.25 mm < 0.2 mm < 0.16 mm < 0.125 mm < 0.1 mm < 0.063 mm	100.099.999.899. 195.980.9	99.999.899.195. 589.568.2	99.999.497.492. 083.758.7	99.798.895.288.1 78.852.0
V2	37100	39500	39600	39800
[ %]	1.5	1.7	1.6	1.3
[g/ ]	431	424	414	414
< 15.5 μm < 11 μm < 5.5 μm	3.41.20.0	2.20.80.0	1.20.40.0	1.00.30.0

&lt; &gt;

10 - 13

MHEC

[ 2 ]

< 0.25 mm < 0.2 mm < 0.16 mm < 0.125 mm < 0.1 mm < 0.063 mm	100.0100.0100.092.780.95 3.0	100.0100.0100.093.983.554. 9
V2	35900	34500
[ %]	2.3	2.3
[g/ ]	382	376
< 15.5 μm < 11 μm < 5.5 μm	5.44.12.9	7.86.03.9

[ 3 ]

MT 13 - 16	13	14	15	16
DS (M)	1.45	1.45	1.45	1.45
MS (HE)	0.21	0.21	0.21	0.21
[%]	22.5	26	26	30
[kg/h]	53	103	107	110
[ /s]	4420	4420	3540	4420
T [ ]	150 - 160	180 - 200	210 - 230	190 - 200
T [ ]	120	120	120	120
115 가 [m³/h]	1850	1850	1800	1850
/ [%]	56	70	71	71
< 0.25 mm < 0.2 mm < 0.16 mm < 0.125 mm < 0.1 mm < 0.063 mm	100.099.999.898.996.886.6	100.099.999,999.898.892.9	100.0100.099.999.698.188.1	100.0100.0100.099.898.085.9
V2	13300	15000	15900	16100
[ %]	1.4	2.1	1.6	2.1
[g/ ]	360	324	334	247
< 15.5 μm < 11 μm < 5.5 μm	8.93.90.6	19.18.80.5	9.64.40.9	10.75.31.0

30 , MT 1 - 16 12 가

가

가 가

(57)

1.

a) 80 % ; 50 %

b) 가 가 (i) 가 가 (ii) 가 가 ( ) ; 40 % 99 %

c) 가 ;

d)

2.

1 , 가 20 % 50 %

3.

1 , , 가 a) c)  
가 .

4.

1 , 가 .

5.

1 , 0 60 가 - ,

6.

1 , 가 .

7.

1 , b) 가 가 .

8.

1 , - b) 가

9.

2 % 5 μm , 15 μm 1 % 5 % , 10 μm , 1

10.

10 % 5 μm , 15 μm 2 % 20 % , 10 μm , 1

11.

(sieving)

- % , 1

A

%

< 0.25 mm 98.5 - 100

< 0.2 mm 95 - 100

< 0.16 mm 89 - 98

< 0.125 mm 79 - 92

< 0.1 mm 65 - 80

< 0.063 mm 35 - 45;

- B

%

< 0.25 mm 99 - 100

< 0.2 mm 98 - 100

< 0.16 mm 93 - 100

< 0.125 mm 85 - 94.5

< 0.1 mm 75 - 88

< 0.063 mm 45 - 55;

- C

%

< 0.25 mm 99 - 100

< 0.2 mm 98.5 - 100

< 0.16 mm 95.5 - 100

< 0.125 mm 89 - 96.5

< 0.1 mm 81 - 91.5

< 0.063 mm 55 - 65;

- D

%

< 0.25 mm 99.5 - 100

< 0.2 mm 99.0 - 100

< 0.16 mm 97.0 - 100

< 0.125 mm 93 - 98

< 0.1 mm 86 - 94.5

< 0.063 mm 65 - 75;

- E

%

< 0.25 mm 99.9 - 100

< 0.2 mm 99.5 - 100

< 0.16 mm 97.5 - 100

< 0.125 mm 95.5 - 99.5

< 0.1 mm 91 - 97

< 0.063 mm 75 - 85;

- F

%

< 0.25 mm 99.9 - 100

< 0.2 mm 99.5 - 100

< 0.16 mm 98.5 - 100

< 0.125 mm 96.5 - 99.9

< 0.1 mm 94 - 99.5

< 0.063 mm 85 - 95.

12.

9

13.

9 , , ,

.

14.

9 .