5. COLUMN COMPONENTS

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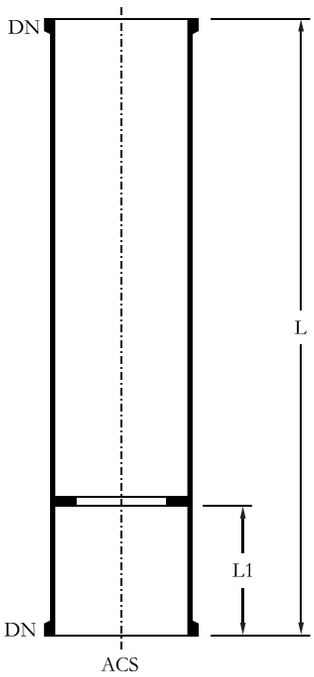
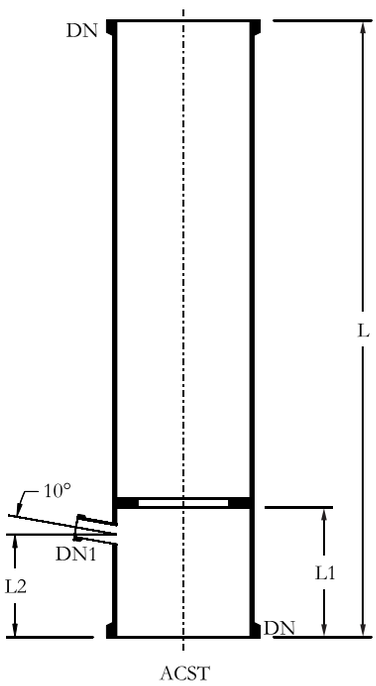




INTRODUCTION

Column components are extensively used in the chemical, pharmaceutical and allied industries together with other applications such as food and drink production, dye works and electroplating. This is because of the special properties of borosilicate glass 3.3 and PTFE together with the special materials that are used in some instances for internals, plus the fact that borosilicate glass 3.3 is an approved and proven material of construction for pressure vessels.

1. Being inert, the risk of contamination is negligible.
2. Their transparency permits constant visual monitoring of the process at all times.
3. With almost universal resistance to corrosion, a long service life is guaranteed and maintenance is kept to a minimum.
4. Smooth surfaces allow easy cleaning and sterilization and prevent the build-up of solids on the inner walls.

COLUMN SECTION

All column sections are supplied complete with support. The packing must be ordered separately. On special request column sections can be supplied without the packing support. Column sections and pipe sections may be used for the construction of columns of all nominal bores provided that the weight of the packing and retained liquid does not exceed the load-bearing capacity of the support. Column section can also be provided with a thermometer branch below the packing support.

DN	DN1	L	L1	L2	CAT. REF.
80	25	1000	125	100	ACS3/1000
100	25	1000	125	100	ACS4/1000
150	25	1000	125	100	ACS6/1000
225	25	1000	125	100	ACS9/1000
225	25	1500	150	125	ACS9/1500
300	25	1000	150	125	ACS12/1000
300	25	1500	150	125	ACS12/1500
400	25	1000	200	150	ACS16/1000
400	25	1500	200	150	ACS16/1500
450	25	1000	200	150	ACS18/1000
450	25	1500	200	150	ACS18/1500
600	25	1000	200	150	ACS24/1000

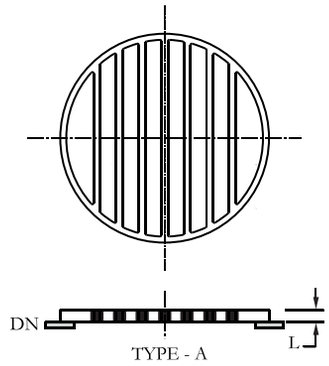
** Above column sections can be provided with a thermometer branch. Please mention the Cat. Ref. (ACST)*

PACKING SUPPORT

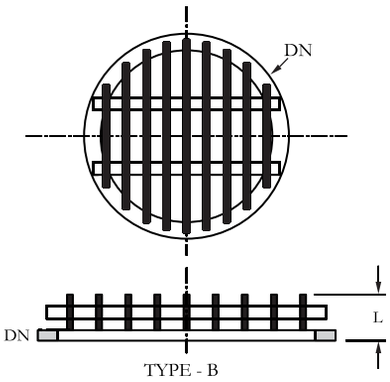
Since packing support is supplied as part of the column section assembly, it is normally only ordered separately when replacements are required. The PTFE ring on which it is seated is supplied complete with the support.

Standard packing support for columns DN 80 to DN 300 is manufactured from borosilicate glass. From DN 400 and above, a combination of glass and PTFE is used for it is construction, thus maintaining maximum resistance to corrosion.

There are two types of packing supports, Type A and Type B. Type A are made of fused glass rods and Type B (heavy duty) are made of glass plates, vertically arranged and tied with PTFE tie rods.



DN	L	MAXIMUM LOAD (Kg.)	MAXIMUM PACKING SIZE (Kg.)	TYPE	CAT. REF.
80	20	10	12	A	ACP 3
100	20	15	15	A	ACP 4
150	30	30	25	A	ACP 6
225	30	50	25	A	ACP 9
300	30	75	25	A	ACP 12
400	70	150	25	B	AHD 16
450	70	200	25	B	AHD 18
600	95	300	40	B	AHD 24

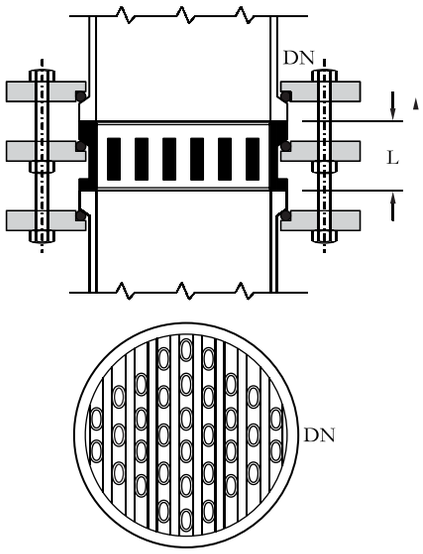


SUPPORT PLATE ASSEMBLY

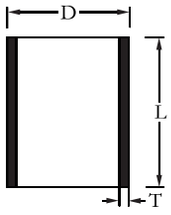
If the free cross-sections obtained with the combination of column sections and packing supports are not large enough, then an alternative is to use type APS pipe sections in combination with fixed support plates.

Each item comprises the glass supports plate, screwed rod with nuts, flat washers and compression springs and the special backing flange required for the assembly.

DN	L	MAXIMUM LOAD (Kg.)	CAT. REF.
80	25	20	ALBE 3
100	25	30	ALBE 4
150	50	60	ALBE 6
225	50	90	ALBE 9
300	50	150	ALBE 12



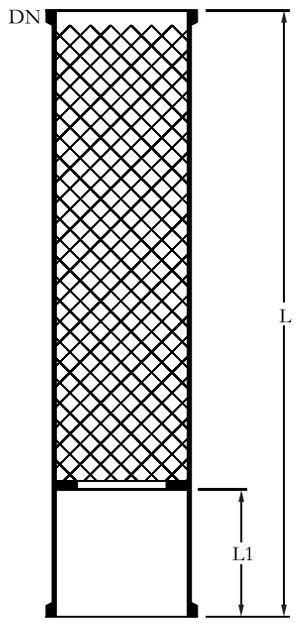
COLUMN COMPONENTS



COLUMN PACKING RASCHING RING

Rasching ring up to 25mm are of neutral glass. 40mm and 50mm Rasching rings are available in borosilicate glass.

DxL	Wall Thickness(T)	Bulk Density (Kg./Ltr.)	Specific Surface (m^2/m^3)	CAT. REF.
8 X 8	1.0	0.60	500	AFC 8
12 X 12	1.0	0.50	400	AFC 12
15 X 15	1.6	0.75	300	AFC 15
20 X 20	1.1	0.45	280	AFC 20
25 X 25	2.0	0.27	200	AFC 25
30 X 30	2.0	0.40	176	AFC 30
40 X 40	1.75	0.27	160	AFC 40
50 X 50	2.0	0.25	120	AFC 50

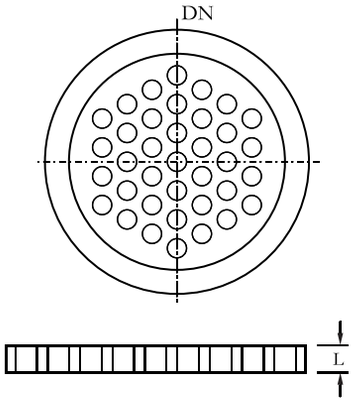


PACKING REQUIRE FOR VARIOUS COLUMN SECTION (KGS.)

COLUMN SECTION - SIZE	Vol LITER	AFC 8	AFC 12	AFC 15	AFC 20	AFC 30	AFC 40	AFC 50
ACS 3/1000	4.4	2.6	2.2	3.3	2.0	1.8	1.2	1.1
ACS 4/1000	7.6	4.6	3.8	5.7	3.4	3.0	2.1	1.9
ACS 6/1000	15.5	9.3	7.8	11.6	7.0	6.2	4.2	3.9
ACS 9/1000	31.8	19.1	15.9	23.9	14.3	12.7	8.6	8.0
ACS 12/1000	61.9	37.1	31.0	46.4	27.9	24.8	16.7	15.5
ACS 16/1000	110	66.0	55.0	82.5	49.5	44.0	29.7	27.5
ACS 18/1000	145	87.0	72.5	108.8	65.3	58.0	39.2	36.3
ACS 24/1000	255	153.0	127.5	191.3	114.8	102.0	68.9	63.8

Notes of use of column packing:

1. Due to their low bulk densities, glass rasching rings are particularly suitable for packing glass columns.
2. Generally the ratio of column diameter to packing diameter should not be less than 8:1.
3. When using smaller packing size, a small layer of larger packing should be used on packing support, to prevent the smaller packing falling through.
4. In vacuum application and applications involving high vapour velocities, packing may be lifted and may damage other parts. To prevent this, a packing retainer (PTFE Performance Plates) should be used above the packed section.



PTFE- PERFORATED PLATE/PACKING RETAINER

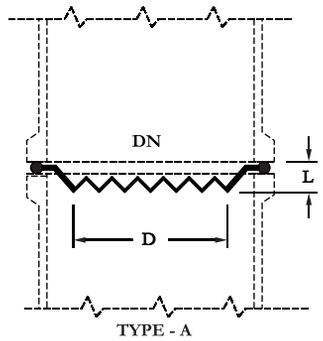
Packing retainer is installed above packed column section to prevent any carry-over of column packing. It is installed in the same way as gaskets between two flat buttress end faces and therefore no gasket is required. Packing retainer is manufactured from PTFE for maximum resistance to corrosion. It cannot be used as packing support.

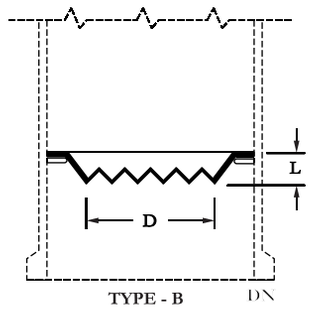
DN	L	FREE CROSS SECTION AREA (%)	CAT. REF.
80	07	80	ACPP 3
100	07	90	ACPP 4
150	07	90	ACPP 6
225	10	95	ACPP 9
300	10	85	ACPP 12

PTFE RE-DISTRIBUTOR

PTFE re-distributor is installed in the same way as gaskets between two flat buttress end faces and therefore when using it, no gasket is required.

DN	D	L	CAT. REF.
40	28	10	ATL 1.5
50	35	10	ATL 2
80	55	10	ATL 3
100	70	15	ATL 4
150	105	15	ATL 6
225	140	15	ATL 9
300	200	15	ATL 12



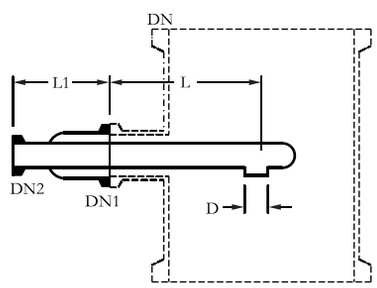


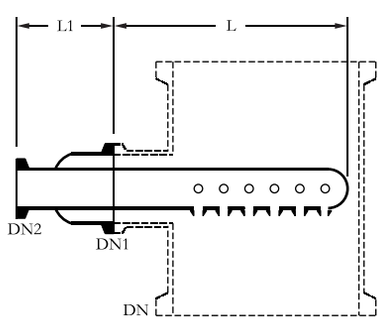
COLUMN FEED PIPE

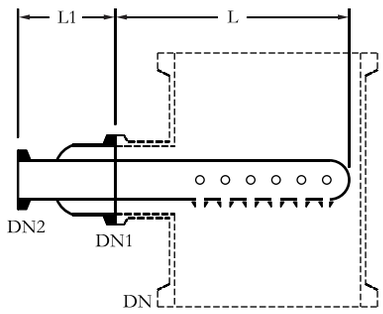
Column feed pipe is designed for applications in which there is a need to introduce the process liquid at a single point. It is usually installed via a type APTU unequal tee piece (see Chapter 2 of this catalogue - Pipeline Components) and have a fused -in distribution tube which directs the fluid down onto the center of the column packing.

Column feed pipe for columns up to DN 600 is manufactured from borosilicate glass. Two types of column feed pipes are available.

DN	DN1	DN2	D	L	L1	CAT. REF.
80	40	25	13	100	115	AFP3
100	40	25	13	125	115	AFP4
150	40	25	13	150	115	AFP6
225	40	25	13	185	115	AFP9
300	40	25	13	230	115	AFP12
450	80	40	25	320	150	AFP18
600	150	50	40	450	200	AFP24



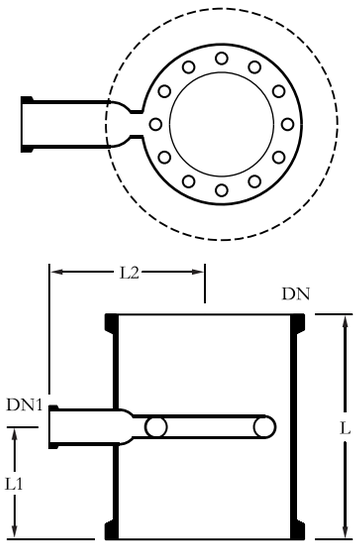




COLUMN FEED SPARGER

In column feed sparger, holes are provided at three sides of the pipe.

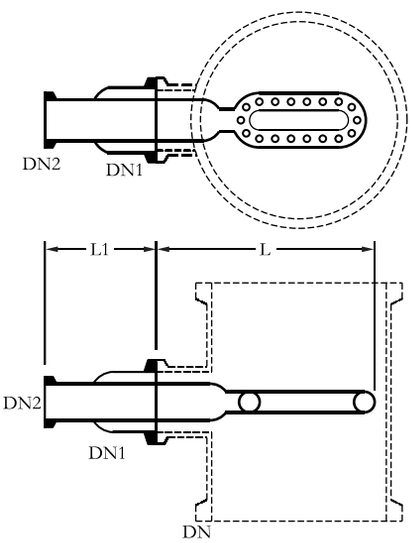
DN	DN1	DN2	L	L1	Dia of Holes x No of Holes	CAT. REF.
80	25	25	125	100	2 x 21 No.	ASPG3
100	25	25	150	100	2 x 21 No.	ASPG4
150	40	25	200	100	2 x 27 No.	ASPG6
225	40	25	275	100	2 x 27 No.	ASPG9
300	40	25	350	100	3 x 30 No.	ASPG12
450	40	25	500	100	3 x 39 No.	ASPG18
600	50	40	650	100	3 x 60 No.	ASPG24



SPRAY FEED SECTION

Spray feed section is provided with circular tube having holes at the bottom.

DN	DN1	L	L1	L2	Dia of Holes x No of Holes	CAT. REF.
80	25	200	100	100	2 x 20	AFR3
100	25	250	125	110	2 x 20	AFR4
150	25	250	125	150	2 x 27	AFR6
225	25	250	125	170	2 x 27	AFR9
300	25	300	150	220	3 x 30	AFR12



SPRAY FEED PIPE

Like column feed pipe, spray feed pipe is usually installed via a type APTU unequal tee piece.

Spray feed section is provided with oval tube having hole at the bottom

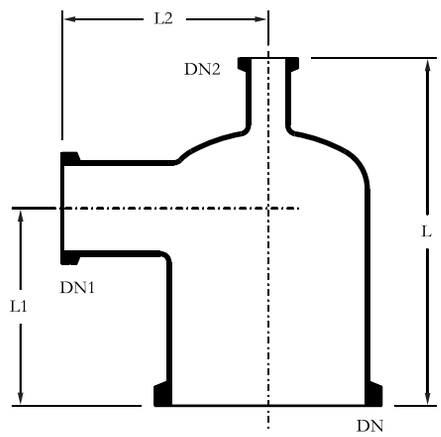
(see Chapter 2 of this catalogue - Pipeline Components).

DN	DN1	DN2	L	L1	Dia of Holes x No of Holes	CAT. REF.
150	80	25	225	125	2 x 27	AFD6
225	100	25	325	150	2 x 27	AFD9
300	150	25	400	200	3 x 30	AFD12
450	150	50	500	200	3 x 40	AFD18
600	150	50	630	200	3 x 60	AFD24

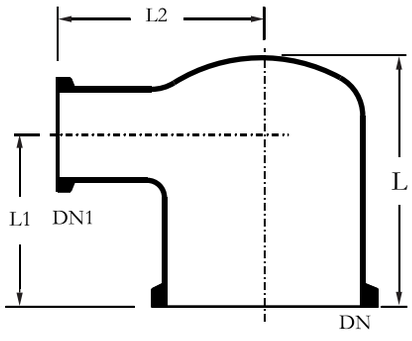
COLUMN ADAPTOR

DN MM	DN1 MM	DN2 MM	L MM	L1 MM	L2 MM	CAT. REF.
80	25	25	150	75	100	ACA3/1/1
80	40	25	175	100	100	ACA3/1.5/1
80	50	25	175	100	100	ACA3/2/1
100	25	25	150	75	125	ACA4/1/1
100	40	25	175	100	125	ACA4/1.5/1
100	50	25	225	125	125	ACA4/2/1
100	80	25	225	125	125	ACA4/3/1
150	25	25	200	100	150	ACA6/1/1
150	40	25	200	100	150	ACA6/1.5/1
150	50	25	250	125	150	ACA6/2/1
150	80	25	250	150	150	ACA6/3/1
150	100	25	250	150	175	ACA6/4/1
225	40	40	250	150	175	ACA9/1.5/1.5
225	50	40	250	150	175	ACA9/2/1.5
225	80	40	300	175	200	ACA9/3/1.5
225	100	40	300	175	200	ACA9/4/1.5
225	150	40	400	200	250	ACA9/6/1.5
300	40	40	300	150	225	ACA12/1.5/1.5
300	50	40	300	150	225	ACA12/2/1.5
300	80	40	300	150	225	ACA12/3/1.5
300	100	40	350	175	250	ACA12/4/1.5
300	150	40	425	225	250	ACA12/6/1.5
300	225	40	450	225	300	ACA12/9/1.5
400	50	50	400	200	300	ACA16/2/2
400	80	50	450	250	300	ACA16/3/2
400	100	50	450	250	300	ACA16/4/2
400	150	50	550	300	350	ACA16/6/2
400	225	50	550	300	350	ACA16/9/2
450	50	50	400	200	325	ACA18/2/2
450	80	50	450	250	350	ACA18/3/2
450	100	50	450	250	350	ACA18/4/2
450	150	50	550	300	350	ACA18/6/2
450	225	50	550	300	400	ACA18/9/2
450	300	50	450	400	400	ACA18/12/2
600	50	50	450	200	400	ACA24/2/2
600	80	50	500	250	400	ACA24/3/2
600	100	50	500	250	400	ACA24/4/2
600	150	50	650	300	450	ACA24/6/2
600	225	50	650	300	450	ACA24/9/2
600	300	50	800	400	500	ACA24/12/2

Column adaptor with DN2 of different size (but maximum equivalent to DN1) can be manufactured with the same dimensions.



COLUMN COMPONENTS



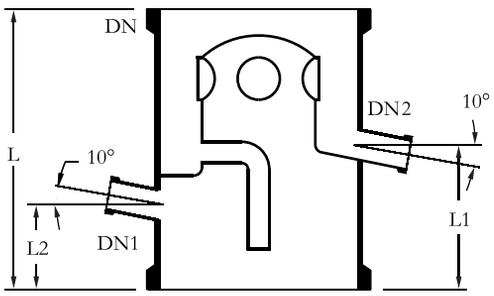
COLUMN ADAPTOR - FLAT TOP

This is generally used as a header of shell & tube heat exchanger and column.

DN MM	DN1 MM	L MM	L1 MM	L2 MM	CAT. REF.
80	25	100	75	100	ACAF3/1
80	40	125	100	100	ACAF3/1.5
100	25	100	75	125	ACAF4/1
100	40	125	100	125	ACAF4/1.5
150	25	150	100	150	ACAF6/1
150	40	150	100	150	ACAF6/1.5
150	50	200	125	150	ACAF6/2
150	80	200	150	100	ACAF6/3
225	40	200	150	175	ACAF9/1.5
225	50	200	150	175	ACAF9/2
225	80	250	175	175	ACAF9/3
225	100	250	175	175	ACAF9/4
300	50	250	150	225	ACAF12/2
300	80	250	150	225	ACAF12/3
300	100	300	175	250	ACAF12/4
300	150	350	225	300	ACAF12/6
450	150	420	310	380	ACAF18/6[1]

REFLUX DIVIDER - MANUALLY OPERATED

In this component, the reflux is adjusted by means of a valve on the outlet connection. When the valve is fully open the divider is set to total distillate off-take, since the reflux pipe is higher than the outlet connection. By regulating the valve, the reflux ratio can be continuously adjusted up to total reflux.



DN	DN1	DN2	L	L1	L2	CAT. REF.
80	25	25	200	100	85	ARDA 3
100	25	25	250	150	95	ARDA 4
150	25	25	250	150	100	ARDA 6
225	25	25	375	150	115	ARDA 9
300	25	25	375	150	115	ARDA 12
400	40	40	500	200	150	ARDA16
450	40	40	600	275	150	ARDA 18

DN1 is used for insertion of a thermometer pocket. DN2 is recommended on the distillate outlet.

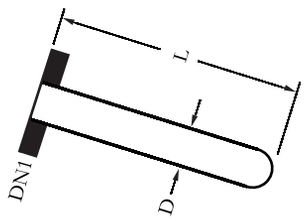
FLOW DATA FOR ARDA

FREE CROSS SECTION AREA FOR VAPOURS (cm^2)	L1 MAXIMUM DISTILLATE VOLUME IN RELATION TO WATER 20°C (L/H)
20	300
50	475
100	700
150	900
250	1100
350	1300
500	1500

THERMOMETER POCKET FOR REFLUX DIVIDER

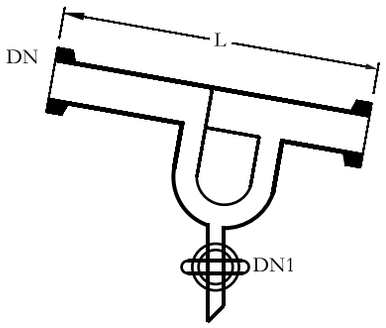
These thermometer pockets are to be used with reflux divider or column sections. DN refres to the nominal diameter of the REFLUX DIVIDER OR COLUMN.

DN1 MM	D MM	L MM	CAT. REF.
25	12	100	ATPR 3
25	12	125	ATPR 4
25	12	150	ATPR 6
25	12	200	ATPR 9
25	12	250	ATPR 2
40	19	350	ATPR 16
40	19	400	ATPR 18



LIQUID SEAL

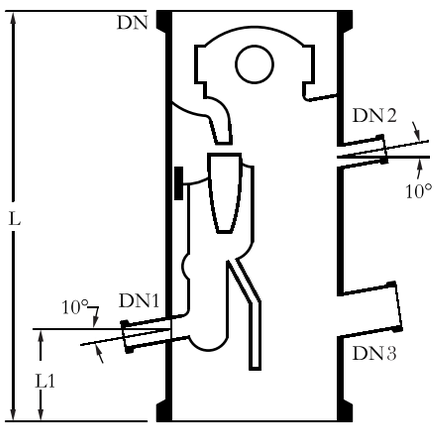
DN	DN1	L	CAT. REF.
25	25	160	ALS 1
40	25	315	ALS 1.5



REFLUX DIVIDER - AUTOMATICALLY OPERATED (MAGNETICALLY)

This type of reflux divider uses a swinging funnel mechanism. The funnel, which has a soft iron core sealed into it, is operated magnetically from outside the column , so that the condensate can be removed from the column and reflux returned to the column in correct ratio. Activation of the electro-magnet moves the funnel into the off-take position. The electro-magnet and timer should be ordered separately. Main nozzel (DN2) is provided for ARHM 9 and above sizes.

DN MM	DN1 MM	DN2 MM	DN3 MM	L MM	L1 MM	CAT. REF.
80	25	25	-	375	75	ARHM3
100	25	25	-	400	75	ARHM4
150	25	25	-	450	100	ARHM6
225	25	25	100	550	100	ARHM9
300	25	25	100	700	100	ARHM12
400	40	40	100	800	150	ARHM16
450	40	40	100	900	150	ARHM18



FLOW DATA FOR ARHM

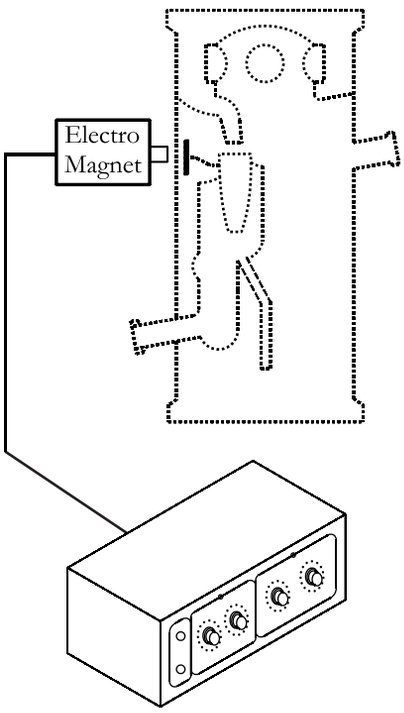
FREE CROSS SECTION AREA FOR VAPOURS (cm^2)	MAXIMUM DISTILLATE VOLUME IN RELATION TO WATER 20°C (L/H)
20	90
50	180
100	300
150	500
250	650
350	1000
500	1300

ELECTRO – MAGNET

Electro-magnet is used to operate magnetically operated Reflux dividers. When 'On' the magnet attracts the swinging funnel of the reflux divider so that distillate can be taken off.

Electro-magnets are to be mounted outside the glass column, just near to the reflux divider, with the help of adjustable fittings. This is designed to use with Timers to maintain correct ration between 'Off' and 'On' timings of its activation.

Electro-magnet work on 220V DC power supply, for which an output socket is provided in the Timer.



Cat. Ref.	Type
RPM	Non-flameproof
RPF	Flameproof

TIMER

Timer is designed to use with Electro-magnets to provide a correct ratio of reflux and distillate when operating a Magnetically operated reflux divider.

Two independent knobs are provided for time settings of Reflux and Off-take. During 'Off-take' it activates the electro-magnet, which attracts the swinging funnel of reflux divider, and distillation comes out. Both periods can be set accurately within a range of 0-50 seconds.

Timer work on a power supply of 230V, 50Hz.

Cat. Ref.	Type
QRT	Non-flameproof
QRF	Flameproof