

Industrial air cooler VCI

Cooling/Freezing

Cu/Al - R404A

GEA Refrigeration



Goedhart



Goedhart VCI

The extensive range Goedhart VCI single discharge ceiling mounted industrial air coolers are available with capacities between 3,4 and 149 kW. The Goedhart VCI air coolers are suitable for cooling and freezing applications and with a wide variety of accessories and options available. The coil block is standard build from aluminium end plates, copper tubes and aluminium fins. The fans are arranged for blow-through air configuration for the Goedhart VCI-B and draw-through for the Goedhart VCI-Z (please state which is required when ordering).. The modular design incorporates 5 different sizes of fan, with model options of up to 8 fans per cooler.

Type description

VCI-B 63457

B=Blow through
Z=Draw through

Number of rows deep

Number of fans

Fin spacing

Fan diameter
in cm

Coil block

- Tube pitch : 50x50 mm straight
- Fin spacing : 4, 6, 7, 8 and 10 mm
- Material : 15mm o.d copper tube
- : aluminium HT-lamellen
- Optimized cooling circuits
- Standard refrigerant connections are positioned on the left hand side of the unit when looking with the direction of the airflow.
- A good thermal contact is achieved by expansion of the tubes into the fin collars, that are also utilised as spacers to provide a constant distance between the fins.
- All coolers are pressure tested to 30 bar (lower by cooling mediums) and are supplied with a light over pressure charge of dry nitrogen.
- Suitable for all known refrigerants and coolants, with the exception of NH3.

Casing

- Construction for ceiling mounting
- The flush mounting protects against and prevents accumulation of dust and dirt.
- Casing material of galvanized sheet steel
- Finishing is standard white epoxy spray (RAL 9003)
- Bend/header projection by end covers, easy removed for maintenance
- Hinged drip tray.
- Defrost by hot gas spiral or electric defrost elements will be fixed to the bottom side of the coil.

General range features

Capacity

The listed nominal cooling capacities are based on R404A en DT1

Influence of Coating on Capacity

The use of coated fins, or of a fully coated coil will result in a capacity decrease of approximately 3%

Capacity optimisation

Since Goedhart tries to limit stock products, we are capable of optimising the circuitry of our evaporators. In order to do this, the following information is needed :

- Design capacity
- Air volume
- Refrigerant
- Air on temperature
- Evaporating temperature
- Liquid temperature before expansion valve.

Sound data

The mean sound pressure (LpA @ 3m ± 2 dB (A)) each air cooler is a calculated indication value according to the EN13487 standard parallel pipe. Goedhart uses the fan manufacturer's sound power level (LwA) at the inlet side of the fan. Changes to or by the fan or the product, affect the sound, in these cases, consult the manufacturer for the new indication value. In critical sound requirements, we advise you to consult an expert.

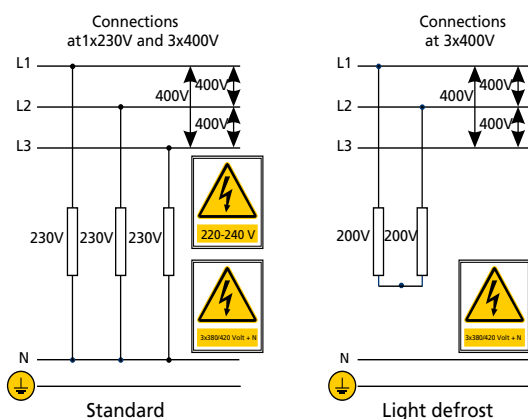
Defrostsystm:

For room temperatures where ice build-up can be expected and where the coilblock can not be defrosted by the room air, electric or hotgas defrost is necessary.

With low temperatures we also advise fan periphery heating.

Electrical defrost:

The Goedhart VRB and VRZ can be provided with electric defrost. A distinction can be made here between heavy defrost loads for low temperatures and light defrost load for higher temperatures (room temperature approximately 0 °C). The stainless steel heater elements are fitted in the coilblock in tubes, which forms a high conductive medium between the heaters and the fins. The drip tray heaters are fitted to the underside of the aluminium inner tray with aluminium profiles. The heater elements which are rated for 220/240 V are connected for supply 380/415 V with neutral. The coilblock elements are removable from the end opposite to the refrigerant connections, whilst the tray heater elements can



be removed once the outer tray has been taken off.

Hot gas defrost:

The coil block is suited for hot gas defrost (hot gas supply through the suction header). At an extra price the drip tray can be provided with a hotgas/cooling medium spiral. The stainless steel tubes of the hotgas spiral are enclosed in special aluminium profiles that are rigidly secured to the underside of the aluminium inner tray, thus providing a good bond for maximum heat transfer. Just as with electric defrost a distinction is made with hotgas defrost between light defrost load (room temperature about 0°C) and heavy defrost load.

Accessories:

Standard accessories for the Goedhart VCI air coolers are:

- blow-through / draw-through air configuration
- Electric defrost, hot gas defrost and/or water defrost
- Fan periphery heating
- Insulated drip tray
- Insulated hygienic polyester drip tray
- Goedhart VCI-Z supplied with bellmouth connection per fan for a longer air throw
- Goedhart VCI-B supplied with air diffusor for a longer air throw
- Goedhart VCI-B supplied with air diffusor with air operated damper to increase defrost efficiency (air volume reduced to approx. 90% and capacity reduced to approx. 95%)

The accessories are included in the price list.

Optional extras:

Various optional extras for the VCI are available, price and delivery upon request:

- Isulation disks
- Feet for floor mounting
- Coating of the coil block
- Fan hood
- 60 Hz motors
- EC-fans
- Single phase motors
- Coolants (glycol, water, etc.)
- Pump system
- Other casing materials
- Other fin spacings
- Sea water resistant fins

Mounting and Maintenance

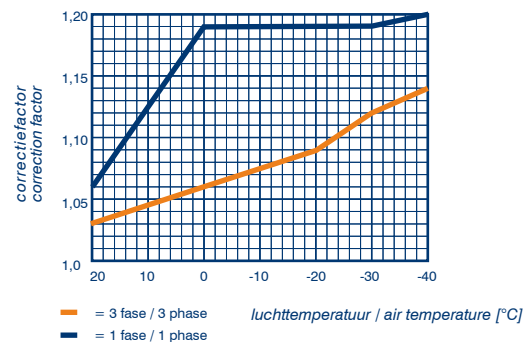
Goedhart VCI is delivered on a wooden frame. When on the frame, Goedhart VCI can be handled by forklift truck, which makes positioning and installation simple. Refer to our maintenance and installation manual.



Fans

The manufacturer of the fans is Süd Electric (we reserve the right to alter the manufacturer). The fans have glass fibre reinforced polypropylene impellers. The motors are available for 400V-50Hz-3 phase or 230V-50Hz-1 phase electrical supply. 2-Speed regulation can be achieved at 400/690V-50Hz-3 phase by using a Δ-Y reconnection (fig. 1). 3 Phase motors are suitable for a frequency controller (A sinus filter is needed, fig. 2). 1 Phase motors are suitable for phase control and transformer. The motors are standard executed with a thermo contact. The fans are suitable for operation in air temperature applications between -40 °C and +45 °C. When the air temperature is lower than -40 °C, special fans are needed. These special fans have a longer delivery time. The technical data in the table below are the same as on the motor name plates and is valid for an air temperature of +40 °C.

For air temperatures lower than +40 °C, the current amperage can be calculated by using the diagram multiplication factor, suitable thermal overloads can then be selected.



Three phase - 50 Hz

Fan type	Tension	Δ				Y			Protection class*	Fan heating
		Speed	Input	FLC	Sound power indication each fan LwA (+/-2dB(A))	Speed	Input	FLC		
	V	min ⁻¹	Watt	A	dB(A)	min ⁻¹	Watt	A		Watt (230V)

4 pole motor (n=1500 rpm nom.)

400-32°	3x400/690	1350	250	0.60	74	1050	150	0.30	IP44	460
450-32°	3x400/690	1350	400	0.85	78	1050	300	0.50	IP44	580
500-40°	3x400/690	1380	880	1.90	85	1050	660	1.15	IP44	580
560-36°	3x400/690	1300	1250	2.30	85	1000	750	1.30	IP66	700
630-32°**	3x400/690	1300	1250	2.30	86	1000	750	1.30	IP66	820
630-28°***	3x230/400				88	1400	1400	2.50	IP66	820

6 pole motor (n=1000 rpm nom.)

400-28°	3x400/690	900	105	0.33	63	750	65	0.13	IP44	460
450-32°	3x400/690	900	180	0.40	69	750	120	0.20	IP44	580
500-40°	3x400/690	900	500	1.00	81	760	350	0.65	IP44	580
560-32°	3x400/690	880	680	1.60	75	680	400	0.90	IP66	700
630-36°	3x400/690	880	680	1.60	80	680	400	0.90	IP66	820

Single phase - 50 Hz

Ventilator type	Speed	Input	FLC	Protection class*
	min ⁻¹	Watt	A	

4 pole motor (n=1500 rpm nom.)

400-32°	1350	450	1.95	IP44
450-32°	1350	450	1.95	IP44
500-40°	1330	700	3.40	IP44
560-36°	1350	920	4.00	IP66
630-32°	1350	1300	7.10	IP66

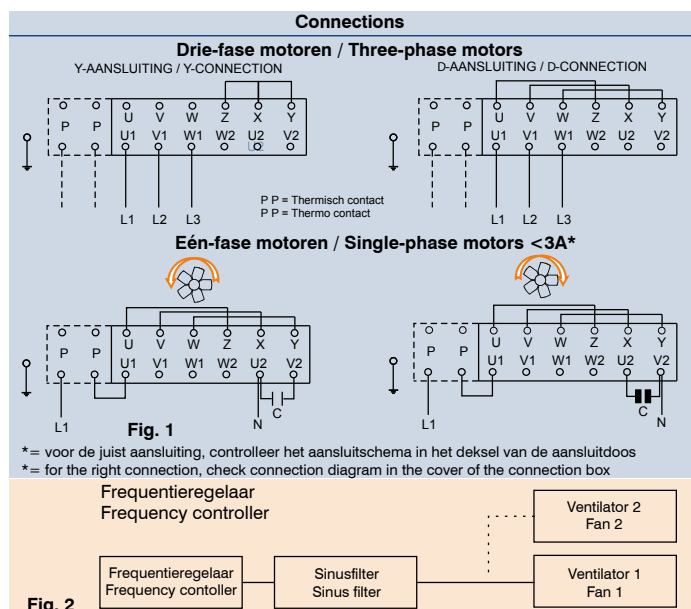
6 pole motor (n=1000 rpm nom.)

400-28°	900	250	1.10	IP44
450-32°	900	250	1.10	IP44
500-40°	900	400	1.75	IP44
560-32°	870	700	3.40	IP66
630-36°	870	700	3.40	IP66

*= IP44 motors also available in IP66 execution (extra price)

**= Only cooling conditions

***= Only freezing conditions



Correction factors

Correction factors DT1 (=air-on)

The capacities are based on R-404A direct expansion, DT1 and a RH of 85 %. DT1 is the difference between air-on temperature and the evaporation temperature of the cooler. The evaporation temperature is the saturate temperature corresponding to the pressure at the suction outlet of the cooler.

The nominal capacities:

- (SC1) $t_o=0^{\circ}\text{C}$ and $\text{DT1}=10\text{K}$
- (SC2) $t_o=-8^{\circ}\text{C}$ and $\text{DT1}=8\text{K}$
- (SC3) $t_o=-25^{\circ}\text{C}$ and $\text{DT1}=7\text{K}$

Correction factors for various air-on temperatures and temperature differences (DT1) are as indicated in the table below. The requested capacity must be multiplied by a correction factor from the table, so that a cooler with the resulting nominal capacity can be chosen from the selection tables.

$Q_{\text{nominal}} = \text{factor} \times Q_{\text{requested}}$

Cooling

DT1	SC1-DT1 =10K-Air-on=10°C (0/+10)										
	Evaporation temperature (°C)										
	K	+7	+6	+5	+4	+3	+2	+1	0	-1	-2
6	1,87	1,87	1,87	1,88	1,88	1,89	1,89	1,89	1,89	1,89	1,90
7	1,53	1,53	1,54	1,54	1,54	1,55	1,55	1,55	1,55	1,55	1,56
8	1,28	1,28	1,28	1,29	1,29	1,30	1,30	1,30	1,30	1,30	1,31
9	1,11	1,11	1,11	1,12	1,12	1,13	1,13	1,13	1,13	1,13	1,14
10	0,98	0,98	0,98	0,99	0,99	0,99	1,00	1,00	1,00	1,00	1,01
11	0,89	0,89	0,89	0,90	0,90	0,91	0,91	0,91	0,91	0,91	0,92
12	0,78	0,79	0,79	0,79	0,80	0,80	0,80	0,80	0,80	0,80	0,81

Cooling / Freezing

DT1	SC2-DT1 =8K-Air-on=0°C (-8/0)									
	Evaporation temperature (°C)									
	K	-3	-4	-5	-6	-7	-8	-9	-10	-11
6	1,32	1,34	1,39	1,43	1,46	1,46	1,47	1,47	1,48	1,49
7	1,05	1,08	1,12	1,15	1,18	1,19	1,19	1,20	1,20	1,21
8	0,86	0,88	0,91	0,94	0,97	1,00	1,00	1,01	1,01	1,02
9	0,76	0,76	0,78	0,80	0,82	0,86	0,86	0,87	0,87	0,88
10	0,66	0,67	0,69	0,71	0,73	0,74	0,74	0,75	0,75	0,76
11	0,58	0,59	0,59	0,60	0,62	0,64	0,64	0,65	0,66	0,67
12	0,55	0,54	0,54	0,54	0,55	0,55	0,56	0,57	0,58	0,59

Freezing

DT1	SC3-DT1 =7K-Air-on=-18°C (-25/-18)										
	Evaporation temperature (°C)										
	K	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30
6	1,20	1,20	1,21	1,21	1,22	1,22	1,23	1,23	1,24	1,24	
7	0,99	0,99	0,99	1,00	1,00	1,00	1,01	1,01	1,02	1,02	
8	0,83	0,84	0,84	0,84	0,85	0,85	0,85	0,85	0,86	0,86	
9	0,72	0,72	0,72	0,73	0,73	0,73	0,73	0,74	0,74	0,74	
10	0,63	0,63	0,63	0,64	0,64	0,64	0,64	0,65	0,65	0,65	
11	0,56	0,56	0,56	0,57	0,57	0,57	0,50	0,58	0,58	0,58	
12	0,50	0,51	0,51	0,51	0,51	0,51	0,52	0,52	0,52	0,52	

Rekenvoorbeeld

Lamelafstand	: 6 mm	-	DT1 = +3- (+10) = 7K
Gevraagde capaciteit	: 30 kW	-	Correctiefactor = 1,54
Luchtintrede temperatuur	: +10 oC	-	Vermenigvuldig gevraagde capaciteit met correctie factor.
Verdampingstemperatuur	: +3 oC	-	30 kW x 1,54 = 46,2 kW
Euroventconditie	: SC1	-	
Koudemiddel	: R-404A	-	Selecteer luchtkoeler uit tabel (SC1 type VCI-B 44566=46,5 kW)

Attention!

Moisture carry over from the coil block:

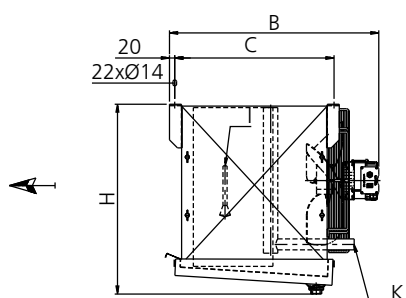
When you select VCI-B with a Ø500 mm fan in an application with a high relative humidity and/or defrost with room air, Goedhart advises the use of a fan with a low pitch angle or the draw-through execution VCI-Z. Thus, you will avoid the risk of moisture carry over from the coil block. The fan with a low pitch angle give a reducing of the capacity of approx. 5% and a reduction of the air volume of approx. 10%.

Air throw** (only draw-through execution)

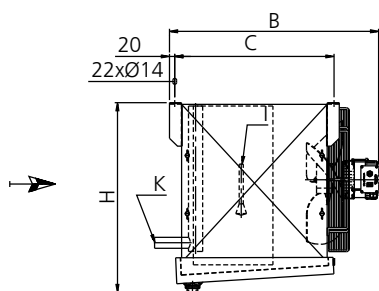
The air throw mentioned in the selection table indicated with ** is based on an air temperature of 20°C, blowing under a flat ceiling without any obstruction. The height and air circulation fold of the room can influence the air throw. The air speed at the end of the throw-length is 0,25 m/sec

VCI 7mm Technical data

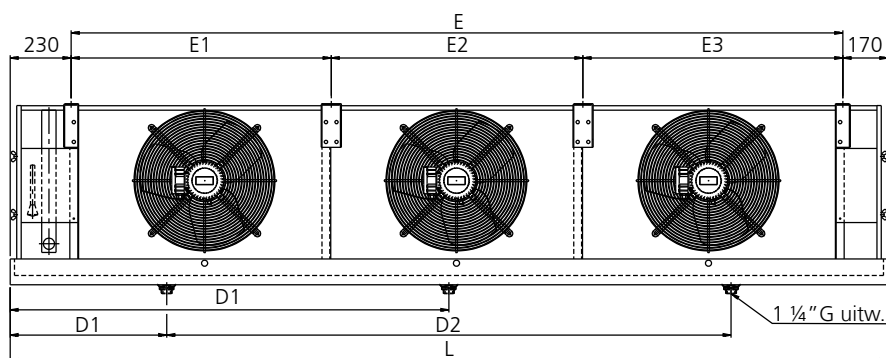
Type VCI	3x400V-50H-4pole (1500 min ⁻¹ nom.)					Surface	Internal volume	Weight	Dimensions										Connections			Air throw**
	R404A			Air volume	LpA @ 3 m (+/- 2 dB(A))*				In	Uit	Hot gas	Refrigerant										
	DT1 = 10K (SC1) lucht on= 0°C (0/+10)	DT1 = 8K (SC2) lucht on= 0°C (-8/0)	DT1 = 7K (SC3) lucht on= -18°C (-25/-18)																			
													kW	kW	kW	m³/h	dB(A)	m²	dm³	kg	mm	
4.1.40.7		4,0	2,8	3430	52	22	6	76	1156	670	620	500		756		578		15	15	19	20	
6.1.40.7		5,1	3,8	3285	52	33	9	80	1156	770	620	600		756		578		12	15	19	20	
8.1.40.7		6,3	4,5	3147	52	44	11	96	1156	870	620	700		756		578		12	22	19	20	
4.1.45.7		5,5	4,1	5206	56	30	8	93	1256	670	720	500		856		628		12	22	19	22,5	
6.1.45.7		7,7	5,4	4968	56	45	12	97	1256	770	720	600		856		628		12	22	19	22,5	
8.1.45.7		9,2	6,6	4754	56	61	16	116	1256	870	720	700		856		628		12	22	19	22,5	
4.1.50.7		7,8	5,5	7387	63	38	10	115	1456	790	720	600		1056		728		12	22	19	25	
6.1.50.7		10,4	7,5	7073	63	57	15	122	1456	890	720	700		1056		728		12	22	19	25	
8.1.50.7		12,4	8,9	6786	63	76	19	143	1456	990	720	800		1056		728		12	28	19	25	
4.1.56.7		10,1	7,6	10553	63	56	14	160	1556	910	920	700		1156		778		12	22	19	27,5	
6.1.56.7		15,1	10,6	10195	63	84	21	166	1556	1010	920	800		1156		778		12	28	19	27,5	
8.1.56.7		16,7	11,5	9864	63	112	28	193	1556	1110	920	900		1156		778		16	28	19	27,5	
4.1.63.7		14,7	10,5	13095	63	76	19	203	1656	910	1120	700		1256		828		12	28	19	27,5	
6.1.63.7		19,6	14,1	12734	63	114	29	206	1656	1010	1120	800		1256		828		16	35	19	27,5	
8.1.63.7		23,3	16,9	12384	63	152	38	243	1656	1110	1120	900		1256		828		16	35	19	27,5	
4.2.40.7		8,0	5,6	6853	55	44	11	123	1856	670	620	500		1456		928		12	22	19	20	
6.2.40.7		10,7	7,6	6563	55	66	17	130	1856	770	620	600		1456		928		12	22	19	20	
8.2.40.7		12,7	9,0	6285	55	89	22	156	1856	870	620	700		1456		928		12	28	19	20	
4.2.45.7		11,7	8,2	10405	59	60	15	151	2056	670	720	500		1656		1028		12	28	19	22,5	
6.2.45.7		15,3	10,7	9926	59	91	23	160	2056	770	720	600		1656		1028		12	28	19	22,5	
8.2.45.7		18,3	13,2	9495	59	121	30	192	2056	870	720	700		1656		1028		16	28	19	22,5	
4.2.50.7		15,6	11,0	14765	66	76	19	191	2456	790	720	600		2056		1228		16	28	19	25	
6.2.50.7		20,8	14,9	14135	66	114	29	205	2456	890	720	700		2056		1228		16	35	35	25	
8.2.50.7		24,7	17,8	13560	66	152	38	242	2456	990	720	800		2056		1228		16	35	35	25	
4.2.56.7		20,4	15,2	21096	66	111	28	267	2656	910	920	700		2256		1328		16	35	35	27,5	
6.2.56.7		30,3	21,2	20378	66	167	42	282	2656	1010	920	800		2256		1328		16	42	35	27,5	
8.2.56.7		34,2	22,9	19714	66	223	55	333	2656	1110	920	900		2256		1328		16	42	35	27,5	
4.2.63.7		29,5	20,9	26184	66	152	38	342	2856	910	1120	700		2456		1428		16	42	35	27,5	
6.2.63.7		39,3	28,2	25457	66	228	57	357	2856	1010	1120	800		2456		1428		22	42	35	27,5	
8.2.63.7		46,5	33,8	24754	66	304	75	424	2856	1110	1120	900		2456		1428		22	42	35	27,5	
4.3.45.7		17,4	12,3	15604	61	91	23	210	2856	670	720	500		2456		1428		16	28	35	22,5	
6.3.45.7		23,3	16,6	14883	61	137	34	225	2856	770	720	600		2456		1428		16	35	35	22,5	
8.3.45.7		27,5	19,4	14236	61	182	45	270	2856	870	720	700		2456		1428		16	35	35	22,5	
4.3.50.7		23,7	16,5	22144	67	114	29	268	3456	790	720	600	1028		2028	864	1728	16	35	35	25	
6.3.50.7		31,5	22,3	21197	67	171	43	288	3456	890	720	700	1028		2028	864	1728	16	42	35	25	
8.3.50.7		37,0	26,7	20333	67	228	57	342	3456	990	720	800	1028		2028	864	1728	16	42	35	25	
4.3.56.7		34,3	23,2	31642	67	167	42	384	3756	910	920	700	1128		2228	939	1878	16	42	35	27,5	
6.3.56.7		45,9	31,8	30562	67	251	62	398	3756	1010	920	800	1128		2228	939	1878	16	42	35	27,5	
8.3.56.7		54,7	38,6	29566	67	334	83	473	3756	1110	920	900	1128		2228	939	1878	22	54	35	27,5	
4.3.63.7		44,2	29,8	39271	67	228	57	483	4056	910	1120	700	1228		2428	1014	2028	22	42	35	27,5	
6.3.63.7		59,5	42,0	38181	67	342	85	507	4056	1010	1120	800	1228		2428	1014	2028	22	54	35	27,5	
8.3.63.7		71,1	49,5	37124	67	456	113	604	4056	1110	1120	900	1228		2428	1014	2028	22	54	35	27,5	
4.4.45.7		23,7	16,4	20802	62	121	30	274	3656	670	720	500	1628		1628	914	1828	16	35	35	22,5	
6.4.45.7		31,3	22,1	19840	62	182	45	287	3656	770	720	600	1628		1628	914	1828	16	42	35	22,5	
8.4.45.7		36,6	26,4	18978	61	243	60	346	3656	870	720	700	1628		1628	914	1828	16	42	35	22,5	
4.4.50.7		31,7	22,0	29523	68	152	38	351	4456	790	720	600	2028		2028	1114	2228	16	42	35	25	
6.4.50.7		42,0	29,7	28259	68	228	57	373	4456	890	720	700	2028		2028	1114	2228	16	42	35	25	
8.4.50.7		49,4	35,6	27107	68	304	75	441	4456	990	720	800	2028		2028	1114	2228	22	42	35	25	
4.4.56.7		41,8	30,5	42182	68	223	55	491	4856	910	920	700	2228		2228	1214	2428	16	42	35	27,5	
6.4.56.7		61,5	42,4	40744	68	334	83	513	4856	1010	920	800	2228		2228	1214	2428	22	54	42	27,5	
8.4.56.7		69,8	45,8	39415	68	446	110	610	4856	1110	920	900	2228		2228	1214	2428	22	54	42	27,5	
4.4.63.7		59,7	41,8	52359	68	304	75	623	5256	910	1120	700	2428		2428	1314	2628	22	54	42	27,5	
6.4.63.7		79,7	56,4	50904	68	456	113	659	5256	1010	1120	800	2428		2428	1314	2628	22	54	42	27,5	
8.4.63.7		93,2	67,6	49495	68	608	150	784	5256	1110	1120	900	2428		2428	1314	2628	28	64	42	27,5	
4.5.45.7		29,7	20,8	26001	62	152	38	333	4456	670	720	500	1628		2428	1114	2228	16	42	35	22,5	
6.5.45.7		38,8	27,8	24798	62	228																



VCI-B



VCI-Z





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