VCM P-10

HIGH SHEAR INLINE HOMOGENIZER · COLLOID MILL

MACHINE PROPERTIES

Q — Capacity (max)	up to 10 t/h finished product, single pass — at reference condition (see note)	T — Product	≤ 210 °C
Reference condition	SBS ≤ 5 %, granule ≤ 3–5 mm, premix pre-dispersed	Premix temperature	190 °C recommended (maximum)
Duty	Polymer modified bitumen (SBS, EVA, APP, crumb rubber) — single pass grinding and homogenising	Viscosity	≤ 5,000 mPa·s (cP)
DN — Inlet / Outlet	DN65 / DN65 · flange EN 1092-1 PN16	Pmax — Operating pressure	5 bar · discharge head ≤ 10 m LC
Working gap	0.5 mm closed (milling) · 2 mm open (start-up)	Suction	≥ 0.3 bar positive, from a positive displacement feed pump
n — Rotor speed	2950 rpm (direct coupled)	Heating jacket	Thermal oil (T) · electric (E) · ≤ 240 °C

OPERATING PRINCIPLE AND CONSTRUCTION

VCM P-10 is an inline rotor-stator homogeniser (colloid mill). The premix enters axially and is drawn into the VIMPO MultiShear™ multi-stage proprietary rotor-stator tool, where it is taken in and pre-broken, then sheared and ground in a progressively narrowing wedge-shaped gap and homogenised — all in a single pass. The working gap is set to 0.5 mm for milling and opened to 2 mm for start-up, which keeps the starting torque and current low. The tool has a strong pumping action that supports the feed pump; a positive displacement pump upstream sets the throughput. Housing and stator support are jacketed so that bitumen never cools in the machine.

- VIMPO MultiShear™ multi-stage proprietary rotor-stator tool — draw-in, shearing/grinding, homogenising in one pass
- Rotor and stator Hardened alloy steel 42CrMo4 (1.7225), induction hardened teeth; housing ring Alloy steel 42CrMo4, hardened
- Working gap OPEN / CLOSED by axial shaft movement — mechanical setting standard, hydraulic actuator with remote OPEN/CLOSED signal optional
- Separate bearing housing (GG25) with grease lubricated rolling bearings — bearings outside the hot product zone
- Shaft seal: gland packing, uncooled (GP) standard · single mechanical seal (MS) optional
- Heating jacket on housing and stator support, thermal oil or electric cartridges
- Machine, motor, ROTEX coupling and guard pre-assembled on a common steel baseplate

APPLICATIONS

- SBS / SB modified bitumen (PMB) for roads, single pass 3–7 % polymer
- EVA, APP, TPU and IPP modified bitumen for roofing and waterproofing membranes
- Crumb rubber modified bitumen (CRMB) — wet process
- Highly modified asphalt (HiMA) with recirculation, polymer up to 10 %
- Grinding of polymer granulate ≤ 5 mm to < 0.2 mm dispersed phase





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MODEL CODE

VCMP10	DN65	T	GP	DD	75	2950
family + size	outlet size	heating	sealing	drive	motor kW	rotor rpm

Fields are separated by a hyphen and always appear in this order. A field is written only where the model offers a choice; an omitted field means the standard. A bare machine (without motor, baseplate and coupling) carries no drive, motor or speed field.

FIELD	VALUES FOR VCM P-10	MEANING
FAMILY + SIZE	VCMP10	VCM P-10 — polymer modified bitumen (P) tool, size 10 t/h homogenising capacity — fixed
OUTLET SIZE	DN65	Outlet DN65 — fixed. Inlet DN65.
HEATING	T · E	T — thermal oil jacket (standard) E — electric heating cartridges with thermostat, for plants without a thermal oil circuit
SEALING	GP · MS	GP — gland packing, Kevlar/graphite, uncooled (standard) MS — single mechanical seal, high temperature faces
DRIVE	DD	DD — direct coupled IEC motor, ROTEX coupling (standard) Written on motor coupled units only.
MOTOR kW	IEC notation	Installed motor rating for VCM P-10: 75 · 110. The decimal separator is written as K (5K5 = 5.5 kW). IE3, 400 V 50 Hz, IP55.
ROTOR rpm	2950	Rotor speed = motor speed on direct coupled units (2-pole 2950 · 4-pole 1450). With belt drive (BD) the speed after the pulley ratio.

EXAMPLE	READS AS
`VCMP10-DN65-T-GP-DD-75-2950`	Complete unit on baseplate, thermal oil jacket, gland packing, direct coupled 75 kW motor, 2950 rpm — standard unit
`VCMP10-DN65-T-GP-DD-110-2950`	Complete unit on baseplate, thermal oil jacket, gland packing, direct coupled 110 kW motor, 2950 rpm
`VCMP10-DN65-E-GP-DD-75-2950`	As the standard unit with electric heating (code E)
`VCMP10-DN65-T-MS-DD-75-2950`	As the standard unit with mechanical seal (code MS)
`VCMP10-DN65-T-GP`	Bare machine with thermal oil jacket — no drive, motor or speed field

DIMENSIONS

General arrangement drawing — machine on baseplate with motor

Baseplate, motor and overall dimensions depend on the selected drive and are issued with the order acknowledgement together with the general assembly drawing.

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CAPACITY AND DRIVE

The rated capacity of VCM P-10 is 10 t/h of finished product in a single pass at the reference condition. The achievable rate falls as the polymer content, the polymer hardness or the feed particle size increases, and with a second pass or recirculation the machine handles the same product at a lower net production rate. Neither the pass number nor the exact derating can be stated generally — the duty is confirmed by Vimpo engineering against the product data of the enquiry, and by test where required.

MOTOR	ROTOR rpm	
75 kW	2950	standard unit
110 kW	2950	option

Motors IE3, 400 V 50 Hz, IP55, direct coupled through a ROTEX coupling. Star-delta or soft starter above 30 kW. The feed rate is set by the positive displacement feed pump; the mill's own pumping effect covers line losses up to 10 m LC at 5 bar maximum operating pressure.

OPERATING CONDITIONS

Feed	Premix from the mixing tank by positive displacement pump (VD / VN series), suction pressure ≥ 0.3 bar. Premix temperature 190 °C recommended; the polymer must be swollen and pre-dispersed by the tank agitator.
Solids	Polymer granulate ≤ 3–5 mm at the inlet, < 0.2 mm at the outlet; solids content ≤ 15 %. No hard mineral particles — strainer (≤ 3 mm mesh) on the suction side.
Temperature	Product ≤ 210 °C · heating jacket ≤ 240 °C. The jacket must be at working temperature before start; never start with cold bitumen in the tool.
Start-up	Gap OPEN (2 mm), feed pump running, then close the gap to 0.5 mm under flow. Starting current stays close to nominal; star-delta or soft starter for motors above 30 kW.
Dry running	Not permitted — the packing and the tool are damaged. Interlock the mill motor with the feed pump and a flow or pressure switch.
Shutdown	Open the gap, flush with hot bitumen or flux oil, keep the jacket heated until the machine is empty. Long standstill: drain through the outlet plug.
Pressure	Operating pressure ≤ 5 bar. A pressure relief in the discharge line is required where the line can be closed.
Direction of rotation	As marked on the bearing housing — uni-directional. Check before coupling the motor.

MATERIAL OPTIONS

Rotor · stator	Hardened alloy steel 42CrMo4 (1.7225), induction hardened teeth (standard) · stainless 1.4112 hardened · tungsten carbide coated teeth for crumb rubber
Housing ring	Alloy steel 42CrMo4, hardened (standard)
Stator support · housing	Cast steel GP240GH / 1.0619 jacketed (standard) · stainless 1.4408
Shaft	42CrMo4 / AISI 4140 tempered steel with stainless sleeve in the seal area
Bearing housing	Cast iron GG25 · grease lubricated rolling bearings, L10h ≥ 25,000 h · oil bath optional
Static seals	FKM (Viton A) O-rings −20 / +200 °C (standard) · FFKM for solvents · graphite gaskets on the jacket
Baseplate · guard	Steel S235 (St 37), painted RAL 5005

SEALING — CODE FIELD GP / MS

GP — Gland packing	Standard. Kevlar/graphite braided packing, uncooled, adjustable gland with stainless shaft sleeve. Slight controlled leakage is normal and lubricates the packing.
MS — Mechanical seal	Option. Single, high temperature seal (SiC / carbon, FFKM or graphite) with quench connection (API 682 Plan 62) for zero-leakage plants.

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HEATING — CODE FIELD T / E

T — Thermal oil jacket	Standard. Jacketed housing and stator support, heating medium connections DN25 PN16 (DN40 on P-20) · ≤ 240 °C / 10 bar.
E — Electric heating	Option. Heating cartridges in the housing and stator support with PT100 and thermostat, 400 V; heating power stated with the order. For plants without a thermal oil circuit.
Insulation	Removable insulation jackets for housing and piping — option.

SCOPE OF SUPPLY AND OPTIONS

Standard unit	Homogeniser with thermal oil jacket · IEC motor 75 kW IE3 IP55 · ROTEX coupling and guard · steel baseplate · mechanical gap setting OPEN/CLOSED · factory test run
Bare machine	Homogeniser only — without motor, coupling and baseplate, for integration into an existing plant. Code without drive, kW and rpm fields.
Options	hydraulic gap actuator OPEN/CLOSED with control box (LOCAL/REMOTE, 24 V I/O) · stepless gap control · electric heating (E) · mechanical seal (MS) · larger motor · ATEX motor · soft starter or VFD control panel with ammeter and interlocks · feed pump (VD / VN) on common skid · suction strainer · insulation · stainless tool for food / cosmetics
Paint	Epoxy primer 60 µm + silicone based heat resistant top coat for hot surfaces · baseplate polyurethane · RAL 5005 (Vimpo blue), other RAL with the order.
ATEX	Available in ATEX version — II ½G Ex h IIB T4 Ga/Gb, zones 0 and 1 (2014/34/EU · EN ISO 80079-36/-37); EU-type examination certificate IEP 24 ATEX 1315X Suppl. 01, notified body 2284. Liquid temperature max. 130 °C. The motor is of Ex d or Ex e type to EN 60079-0/-1/-7. Any temperature or pressure sensor fitted must itself be Ex protected (zone 1, IIB, min. T4). Installation and periodic maintenance by authorised personnel to the operating instructions; replacement of a part requires re-approval. Zone, gas group and temperature class stated with the order.
Documents	CE declaration of conformity (2006/42/EC) · operating and maintenance manual · general assembly drawing with parts list · sectional drawing · material certificates EN 10204 2.1 (3.1 optional) · workshop test protocol · electrical diagrams (with control option)

APPLICABLE STANDARDS

2006/42/EC	Machinery Directive — CE declaration of conformity
EN ISO 12100	Safety of machinery — risk assessment
EN 809	Pumps and pump units for liquids — safety requirements (pumping action of the machine)
2014/34/EU	ATEX — equipment for explosive atmospheres (optional version)
EN 1092-1	Steel flanges — dimensions and pressure rating
EN 10204	Material inspection certificates 2.1 / 3.1
EN 12697-x · EN 14023	PMB test methods and specification framework (product quality reference)
IEC 60034 · IEC 60072	Motor efficiency class IE3 and IEC frame dimensions

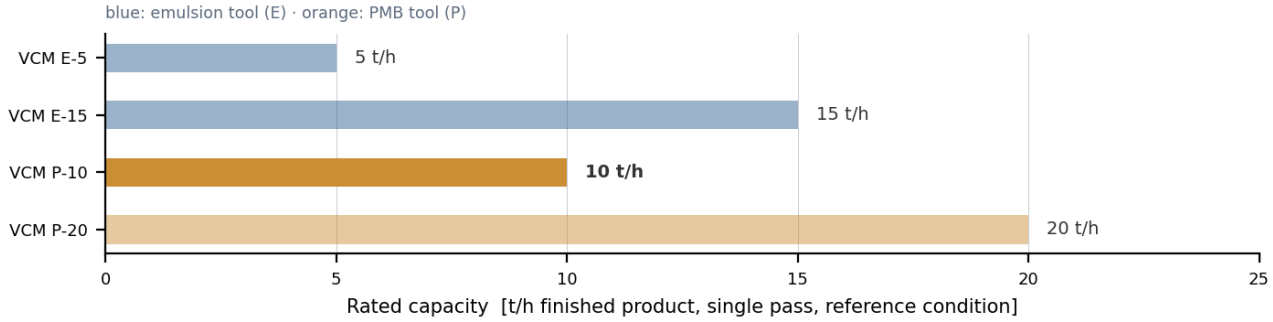
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APPLICATION GUIDE — RECOMMENDED CONFIGURATION BY PRODUCT

PRODUCT	MODEL	TOOL	HEATING · TEMP.	SEAL	NOTES
Bitumen emulsion cationic / anionic, 60–70 %	VCM E-5 · E-15	Stainless tool (standard E)	T or E · 130–140 °C bitumen, 40–60 °C water phase	GP	Bitumen and soap dosed by two PD pumps into the mill inlet; back pressure 2–3 bar keeps the emulsion below boiling.
Polymer modified emulsion latex SBR / natural	VCM E-5 · E-15	Stainless tool	T or E	GP	Latex into the water phase or directly at the mill inlet; rate 20 % below emulsion rate.
SBS PMB 3–5 % road binder	VCM P-10 · P-20	Hardened 42CrMo4 tool (standard P)	T · premix 185–190 °C	GP · MS	Single pass, gap 0.5 mm; 1–2 h maturation with agitation after milling.
SBS 5–7 % · HiMA 7–10 %	VCM P-10 · P-20	Hardened tool; larger motor	T · 190 °C	GP · MS	Recirculation over the tank, 2–3 turnovers; hydraulic gap control recommended.
APP / IPP / EVA roofing membrane compound	VCM P-10 · P-20	Hardened tool 1.4112 or carbide coated	T · 180–200 °C	MS	Hard polymers: larger motor, reduced rate, gap 0.5–1.0 mm; filler added after milling.
Crumb rubber 10–20 % CRMB wet process	VCM P-20	Carbide coated teeth	T · 180–190 °C	GP	Rubber ≤ 1 mm; gap 1.0 mm; 45–60 min digestion at temperature with agitation.
Prime coat · cut-back · flux	VCM E-5 · E-15	Standard	T or E · 80–120 °C	GP	Mixing duty, gap open; ATEX version with solvent based cut-backs.
Pastes, greases, wet grinding chemical · food · cosmetic	VCM E-5 · E-15	Stainless 1.4404 tool and housing; FDA elastomers	As the product requires	MS	Special version — compatibility and cleaning (CIP) reviewed per enquiry.

Typical starting points. The final configuration is confirmed by Vimpo engineering against the product data given in the enquiry: polymer type, grade and content, base bitumen, required production rate and plant heating medium.

VCM SERIES — CAPACITY OVERVIEW



MODEL	TOOL	IN / OUT	CAPACITY t/h	MOTORS
VCM E-5	Emulsion	DN65 / DN50	5	15 kW
VCM E-15	Emulsion	DN65 / DN65	15	37 kW · 45 kW
VCM P-10	PMB	DN65 / DN65	10	75 kW · 110 kW
VCM P-20	PMB	DN100 / DN100	20	132 kW · 160 kW @1450

Rated capacities at the reference condition; the achievable rate depends on polymer content, polymer hardness and feed particle size and is confirmed per enquiry. Technical data subject to change without notice.

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