



Fast GC Requirements Reference

Performance Requirement	Performance Specification	Agilent 6850/6890	5890 Series II	Varian 3800	Shimadzu 17A version 3	PE Auto XL
Availability of a wide range of column diameters, lengths, and phases to assist migration to fast GC methods	Major manufacturer of both GC instruments and GC columns	Yes (inventor of fused silica capillary columns)	Yes (inventor of fused silica capillary columns)	Yes (acquired Chrompack, May 1998)	No	No
Ability to convert standard methods to fast methods predictably	Method conversion offered by GC manufacturer	Yes (Method Translation Software)	Yes (Method Translation Software)	No	No	No
Ability to inject sample very quickly to maximize repeatability of retention times	Injection time	0.1 sec	0.1 sec	0.5 sec	0.5 sec	0.3 sec
Ability to inject standard sample volumes or very small sample volumes depending on the capacity of the column	Injection volume range without changing syringe	0.1–2.5 µL (5-µL syringe)	0.1–1.0 µL (5-µL syringe)	0.1–10.0 µL (10-µL syringe)	0.1–8.0 µL (10-µL syringe)	0.1–0.5 µL (0.5-µL syringe) 0.5–5.0 µL (5-µL syringe)
Ability to use hydrogen as a carrier gas safely, accurately, and easily	Automatic oven shutdown if H ₂ leak is detected	Yes	No	No	No	No
	Factory calibrated for hydrogen	Yes	No	No	No	No
Ability to apply high column head pressures to small-diameter columns	Maximum inlet pressure	100 psi (standard) 150-psi option ¹	100 psi	100 psi	58 psi (standard) 142-psi option	100 psi

¹ 150-psi option is available only with 6890



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Ability to achieve high split flows depending on the capacity of the column	Maximum total flow (split + column + purge)	1,000 mL	450 mL	1,000 mL	400 mL	500 mL/min
Ability to increase oven temperature very quickly to facilitate fast separation	Maximum temperature programming rate from 100 to 175	110 °C/min ²	40 °C/min	85 °C/min	40 °C/min	Unknown
Ability to sample the detector signal quickly to resolve very fast peaks	Maximum sampling rate for FID	200 Hz ³	20 Hz	40 Hz	20 Hz	20 Hz
Ability to use electronic pneumatics control to maintain retention times within the very tight time windows associated with fast GC	Pressure setpoint resolution Real time pressure and temperature compensation during flow control	0.01 psi Yes	0.1 psi No	0.1 psi Pressure compensation when method activated, not real time (EFC is thermostated)	1 kpa (0.15 psi) No ambient temperature compensation; pressure compensation when method activated	0.1 psi Yes
Ability to cool the oven quickly to reduce analysis cycle time	Time to cool oven from 350 °C to 50 °C	4.5 min (6890) 6.5 min (6850)	5.7 min	4.5 min	6 min	Unknown

² The 6890 requires 200-V and oven insert options to achieve 110 °C/min. (Without the insert, the rate is 65 °C/min; without either, the rate is 40 °C/min.)

³ The Agilent ChemStation is needed to collect 200-Hz data. When the 6890 is used with the PE Turbochrom link, the combined data rate for all instrument channels cannot exceed 100 Hz. (Four dual-channel 6890s on the PE link are limited to 10 Hz per channel.)

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