

### 1. General Analytical Instruments

BET 비표면적	BELSORP-max II BELSORP-miniX, II	비표면적, 기공분포도, 기공크기, 기공부피 분석 (volumetric method)	MicrotracBEL Japan	
	BELSORP-MR6	비표면적 측정 (dynamic flow method)		
수분, VOC 흡착	BELSORP-GVS	수분 흡착특성평가		
나노그램(ng) 기체흡착	BELQCM	Gas, vapor adsorption measurement by quartz crystal microbalance (QCM)		
다성분 기체흡착	BELSORP-VC	혼합가스 고압 흡착성능평가		
	BELSORP-PVT	혼합가스, isobar 실험 장치		
TPD/TPR/TPO	BELCAT II, M BEL-METAL 1, 3	촉매특성평가 (pulse chemisorption, metal dispersion)		
질량분석	BELMass	Q-Mass spectrometry (1-200 amu)		
고압흡착	BELSORP-HP	(PCT) 200 MPa		
연료전지	BEL-SOFC	고체산화물 연료전지 성능평가		
반응기 Micro-Reactor	BEL-REA	Steam reforming of DME Fischer-Tropsch reaction (GTL) Water gas shift reaction		
밀도 Pycnometer	BELPycno	Volume range: 1, 3.5, 10 cc		
고압흡착, 밀도측정	MPA RuboSORP	고압흡착 (100 bar), 1/3/5 sample ports		RUBOLAB Germany
		고압흡착 (700 bar), 1 sample port		
파과곡선, PSA, VSA	MiniBTC VariPSA	Breakthrough curve PSA (pressure swing adsorption)		
수분흡착	SPS Series	중량식 수분흡착 분석장치 Balance resolution: 0.1, 1, 10 ug Sample weight: 3 mg-220 g 흡착속도	ProUmid USA	
멤브레인 Hollow Fiber 기공분석	Porolux 100 Porolux 500 Porolux 1000	<b>Pore size, gas/liquid permeability</b>	Porometer Belgium	
		Pore size: 90 nm - 500 um		
		Pore size: 13 nm - 500 um		
Pore size: 13 nm - 500 um				
멤브레인 제조/코팅	MEMCAST PLUS	Coating size: 400 x 700 mm Heating up to 100 °C		

<b>멤브레인, Hollow Fiber</b>	<b>MiniMem MaxiMem</b>	<b>Filtration test unit</b> Membrane area: 5, 28 cm <sup>2</sup> / 0.02, 0.3, 2.5 m <sup>2</sup>	<b>PS Prozesstechnik Switzerland</b>
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## 2. Petrochemical Instruments

<b>증기압 Vapor Pressure</b>	<b>MINIVAP VP Vision Crude Oil Package</b>	ASTM D 5188, 5191, 5482, 6377, 6378, 6897, correlation with D 323	<b>Grabner Instruments Austria</b>
<b>연료특성 IR</b>	<b>MINISCAN IR Vision MINISCAN IR LOG ParaFuel</b>	Diesel / bio-diesel fuel analysis with MID/NEAR-FTIR	
<b>증류특성 Distillation</b>	<b>MINIDIS ADXpert</b>	ASTM D 86 atmospheric distillation (new method ASTM D 7344)	
<b>인화점 Flash Point</b>	<b>MINIFLASH TOUCH</b>	Flash point by mini method (low sample amount, safety, rapid)	
<b>흐름특성 Flow-Properties</b>	<b>MINITEST FFK</b>	Lubrication Grease analysis Kesternich DIN 51805	

<b>발연점 Smoke Point</b>	<b>SP10</b>	ASTM D1322, D1655, IP57, ISO 3014 BS 2000-57, JIS K 2537 etc	<b>AD Systems France</b>
<b>JFTOT Jet Fuel Thermal Oxidation Test</b>	<b>DR10</b>	ASTM D3241, ASTM D1655 DEF STAN 91-91	
<b>분산도 Dispersancy</b>	<b>DT100</b>	Simultaneous measurement of contami- nation index (content of soot insoluble material in the oil)	
<b>REID 증기압</b>	<b>AUTOREID</b>	ASTM D 323 (automated) 기존 방식-수동, 현재방식-자동화	
<b>부식도 Corrosion Tester</b>	<b>CT10</b>	NACE TM0172, ASTM D665, D7548, IP 135, ISO 7120, JIS K2510	

<b>항유화도 Demulsibility</b>	<b>AEDM</b>	Automated Demulsibility Tester ISO 6614, ASTM D1401	<b>Greenlab Hungary</b>
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<b>인화점</b> Flash Point	<b>NPM 450</b>	Penskey Martens flash point tester ASTM D93, IP 34, NFM 07019, ISO 2719, DIN 51758, GBT 261, JIS K2265-3	<b>Normalab</b> France
<b>RTFOT</b> Rolling Thin Film Oven Test	<b>RTFOT CLASSIC</b>	For asphalt, bitumen ASTM D2872, ISO 12607	
<b>침입도</b> penetration	<b>NPN TECH</b>	Full automatic ASTM D217, EN 1426, ASTM D5, ASTM D937, ASTM D1321, IP 49, IP 50	
<b>Grease Worker</b> consistency of lubricating greases	<b>GWM CLASSIC</b>	Half automatic ASTM D217, IP 50, DIN 51580, ISO 2137	
<b>연화점</b> Softening Point	<b>NBA 440</b>	Bitumen ring & ball ASTM D36, EN 1427, ISO 4625, IP 58, DIN 52011	
<b>기포성시험</b> Foaming Test	<b>Foaming</b>	Foaming test of lubricating oils ASTM D892, ASTM D6082, IP 146, ISO 6247, NFT 60129	
<b>ASTM 종류</b> 상평형장치	<b>ASTM Series</b> <b>VLE</b>	i-Fischer® ASTM D 1160, 2892, 5236 General distillation Vapor liquid equilibrium	<b>ILUDEST</b> Germany
<b>ASTM 종류</b>	<b>PAM v2</b>	ASTM D86 Precision automated / semi automated / manual distillation	<b>ORBIS</b> Holland
<b>저온필터막힘점</b> CFPP	<b>AirSTAR CFPP</b>	Temperature: (-)105-(+)35°C	
<b>연료특성평가</b>	<b>FIA-100 FCA</b>	디젤, 벙커 C유 세탄가 측정	<b>Fueltech</b> <b>Solutions</b> Norway
<b>오일연소특성평가</b>	<b>CRU</b>	다양한 연료의 연소 특성 평가	
<b>CRM 표준물질</b> Certified Reference Materials	인화점 Flash point standards 저온필터막힘점 CFPP standards 어는점 Freezing point standards 유동점 Pour point standards	Density standards Color standards Refractive Index standards Viscosity standards	<b>Paragon</b> <b>Scientific</b> UK

### 3. Special Analytical Instruments

연구실용 전기로 furnace	<ul style="list-style-type: none"> <li>- Muffle Furnaces</li> <li>- Ashing Furnaces</li> <li>- Tube Furnaces</li> <li>- Air Circulation Furnaces</li> <li>- Chamber Furnaces</li> <li>- Ovens</li> </ul>	<ul style="list-style-type: none"> <li>- Melting Furnaces</li> <li>- High-Temperature Furnaces</li> <li>- Retort Furnaces</li> <li>- Vacuum Furnaces</li> <li>- Brazing Furnaces</li> <li>- Clean Room Furnaces</li> </ul>	<b>Nabertherm</b> Germany
수은측정기	<b>VM-3000</b>	대기, 기체상의 수은농도 분석	<b>Mercury Instrument</b> Germany
	<b>PA-2</b>	수용액상 수은농도 분석	
수분측정저울	<b>MMS</b>	대기, 기체상의 수은농도 모니터링	<b>Gibertini</b> <b>Electronica</b> Italy
	<b>SM-4</b>	Total mercury emission 분석	
양조학 Oenology	<b>EUROTHERM</b>	전자식 수분 측정 저울	<b>Gibertini</b> <b>Electronica</b> Italy
	<b>Densimat</b>	Hydrostatic balance, density meter	
	<b>Super Dee</b> <b>WINEMATIC</b>	Electronic distilling unit Volatile acidity	
점도측정기	<b>Viscolite 700</b>	Portable viscometer	<b>Hydra-</b> <b>motion</b> UK
	<b>RV-100</b>	Reaction vessel viscometer (continuous real-time viscosity measure)	
	<b>XL7 Viscometer</b>	Process viscometer (any fluid, application and anywhere)	
표면계측기 Surface Metrology	<b>ALTISURF®</b>	물질 표면 구조, 요철, 평면도 분석 Chromatic confocal probe, laser, video camera, optical and contact sensor	<b>ALTIMET</b> France
먼지분석기 Dust Analyzer	<b>Dustmeter</b>	입자, 펠렛형 시료에 포함된 먼지의 양 측정 (DN 33897 / 55992 / 55993)	<b>Heubach</b> Germany
액체질소 공급장치 LN2 Micro-Dosing System	<b>#900 Series</b>	Sub ambient temperature control (0-77 K) LN <sub>2</sub> level control (1 or 2 Point) LN <sub>2</sub> flow control	<b>Norhof</b> Holland
	<b>#400 Series</b>	LN <sub>2</sub> pumping system	