AUTOMATED BLENDING APPARATUS

INCREASE PRECISION

INCREASE SAFETY

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<th><strong>Main Products description</strong></th>
<th><strong>APPLICATIONS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safety Fuels Cans</strong>, supplied with assembly system included Level glass, input manual valve and drain manual glass. 2 models available, 10 &amp; 20 litres. Model for fuels drain available.</td>
<td>Use for Blenders Fuels supply to proceed to ASTM D 2699, D 2700 &amp; D 613. Can be used for any other Fuels supply for any analyser type.</td>
</tr>
<tr>
<td><strong>Nitrogen Fuels Dispensing System</strong>, 5 models available. From 2 up to 6 channels. Stainless steel items for Fuels supply with fully safe operation. Supplied with drum lids equipped with metal/Teflon flexible for safe and easy operability.</td>
<td>Use for Blenders Fuels transfer or fuels supply to proceed to ASTM D 2699, D 2700 &amp; D 613. Can be used for any other Fuels transfer for any analyser type when safety is the key parameter.</td>
</tr>
<tr>
<td><strong>Burettes</strong>, equipped with Auto Zero and Overflow. 2 models available: 400 &amp; 500 ml. Can be supplied, in option, with Certificates.</td>
<td>Manufactured according ASTM D 2699, D 2700 &amp; D 613. Can be used for any blending application. Scale marking type on demand.</td>
</tr>
<tr>
<td><strong>Accessories</strong>, Different filling items to be used with our dark glass bottles, are available. Fittings for flexible, different tubing’s and Level Glass Systems for Safety cans are available.</td>
<td>Used for ASTM D 2699, D 2700 &amp; D 613 and any other Standards where fuels transfer of volume control is required.</td>
</tr>
</tbody>
</table>
“Automated” means that blender has automated system for blending process. All operations are “Automated”. If blender is equipped with burettes then Manual blending can be done.

“Gravity” means that blender works by gravity. According new ASTM Standards. Measures by gravity using a precision balance. This is the most popular product and with the less maintenance requirement of all models of the Blenders range. We recommend Gravity Models.

“Gravity without burettes” means that blender is not equipped with burettes for manual blending.

“Gravity with burettes” means that blender is equipped with burettes for manual blending.

“Volume” means that blender works by “Volume”; according oldest ASTM Standards. Measures by volume are based on lasers detectors looking to burettes meniscus. All “Volume” blenders are equipped with burettes.

“Bottles” concern the dark glass bottles supplied with each Blender unit. Volume Models are supplied with bottles of 500ml (burettes volume) all other Models are supplied with bottles of 1000ml.

“Semi Automated” means Blenders with Auto Zero & over flow glass Burettes and manual operation.

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### Automated Blenders for ASTM D 2699 – D 2700 – D 613

<table>
<thead>
<tr>
<th>Type</th>
<th>Application</th>
<th>Inputs</th>
<th>Nb Burettes</th>
<th>Volume Bottle</th>
<th>Models</th>
<th>Page</th>
</tr>
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<tbody>
<tr>
<td>Gravity without burettes</td>
<td>CETANE</td>
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### Gravity with burettes

<table>
<thead>
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<th>Application</th>
<th>Inputs</th>
<th>Nb Burettes</th>
<th>Volume Bottle</th>
<th>Models</th>
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### Volume (Always with burettes)

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<th>Inputs</th>
<th>Nb Burettes</th>
<th>Volume Bottle</th>
<th>Models</th>
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<tr>
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### Semi Automated Blenders for ASTM D 2699 – D 2700 – D 613

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<tr>
<th>Type</th>
<th>Application</th>
<th>Inputs</th>
<th>Nb Burettes</th>
<th>Volume Bottle</th>
<th>Models</th>
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<td>OC-03-M</td>
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<td>OCTANE</td>
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<tr>
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<td>CETANE</td>
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<td>CETANE</td>
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<td>OCCE-06-M</td>
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</table>
AUTOMATED GRAVITY BLENDERS

OCTANE and CETANE REFERENCE FUELS BLENDING

- FULLY conform to Methods:
  - ASTM D2699
  - ASTM D2700
  - ASTM D613
- Rapid Gravimetric Blending
- Precision of 0.02 mg
- Reduced Operators Errors
- Reduced drastically Production give away
- Simple Operation
- Fully Automated Blend Preparation of:
  - Octane Primary Reference Fuels (PRF / TSF)
  - Cetane Secondary Reference Fuels (SRF)
- Precision Balance Gravimetric Measurement
- Space Saving, Small Foot Print Cabinet
- Traceability of Blends Production
- Information if Fuels drums is empty
- Windows XP Application Software

MODELS WITHOUT BURETTES
7 models available

MODELS WITH BURETTES
6 models available

Technical Data Sheet BL-030

Main software screen

Example of result print out

Screen examples

Technical Data Sheet BL-031

SAME SPECIFICATIONS
+ Manual blends facility with burette models

Burettes can be supplied with certification

Technical Data Sheet BL-031

NO FUEL STORAGE inside Blenders Cabinets
SAFETY FIRST

All Models
CE Marked

High precision balance supplied with each model

Each model supplied with PC and Printer

Easy setup user friendly software

Height : 500mm / Large : 600 mm
Depth : 400 mm / Weight : 45 kg.

Burettes can be supplied with certification

Height : 1200mm / Large : 600mm
Depth : 400 mm / Weight : 50 kg
AUTOMATED VOLUME BLENDERS

VOLUME MODELS
2 models available

Height : 1200mm / Large : 600 mm
Depth : 400 mm / Weight : 45 kg.

Semi-Automated Blend Preparation of:
Octane Primary Reference Fuels (PRF / TSF)
Manual Blends Facility with each model
Motor Driven Laser Detector
Space Saving, Small Foot Print Cabinet
Traceability of Blends Production
Information if Fuels drums is empty
Windows XP Application Software

Technical Data Sheet BL-033

OCTANE and CETANE REFERENCE FUELS BLENDING

- FULLY conform to Methods:
  - ASTM D2699
  - ASTM D2700
- Rapid Volumetric Blending
- Precision of 0.02 ml
- Reduced Operators Errors
- Reduced drastically Production give away
- Simple Operation
- Fully Automated Blend Preparation of:
  Octane Primary Reference Fuels (PRF / TSF)
- Manual Blends Facility with each model
- Motor Driven Laser Detector
- Space Saving, Small Foot Print Cabinet
- Traceability of Blends Production
- Information if Fuels drums is empty
- Windows XP Application Software

Technical Data Sheet BL-032

Semi-Automated BLENDERS

OCTANE and CETANE REFERENCE FUELS BLENDING

- FULLY conform to Methods:
  - ASTM D2699
  - ASTM D2700
  - ASTM D613
- Volumetric Blending
- Simple Operation
- Burettes with Automatic Zero
- Burettes Certification Available
- Blend Preparation of:
  Octane Primary Reference Fuels (PRF / TSF)
  Cetane Secondary Reference Fuels (SRF)
- Space Saving, Small Foot Print Cabinet

Technical Data Sheet BL-033

Burettes can be supplied with certification

Height : 1200mm / Large : 600 mm
Depth : 400 mm / Weight : 45 kg.
SAFETY FLAMMABLES CONTAINERS

Equipped Glass Level + valves Assembly System for filling and draining Safety Flammables Containers

Note: It is important that Fuels used for Reference Fuels Blending (PRF/TSF) be at the same temperature before blending. A difference of only 5°C between Fuels can generate a 0.15 O.N. error on PRF & TSF. Direct transfers of Fuels to Blender with pumps generate micro bubbles. These micro bubbles change the density and Octane Number. In order to overcome these two problems, safety Flammable Containers equipped with one glass level, one input filling valve and one output valve to Blender input have been especially designed.

Application: User can check the level and refill the Safety Flammable Container, with the system already used in the laboratory. We can supply nitrogen pressure system to transfer Fuels from main drum to the Safety Flammable Container. By this way thermal stabilization, micro bubbles removing and all safety aspects are covered (small Fuels quantity storage not in closed cabinet and in UL approved containers).

Spécifications:
- Steel Containers
- Approved by FM and T_V/GS
- Assembly System is installed on the 3/4 inch draining access of the Safety Container.
- Can be easily stored of a shelf, for Blenders gravity supply
- Filling orifice equipped with a relief valve for smooth flow supply
- Equipped with one Glass Level.
- Equipped with one input manual valve for Safety Container filling. Two technical solutions:
  - Fuel transfer by Manual filling.
  - Fuel transfer from main storage drum to Safety container by nitrogen pressure.
- Information’s and prices on request.
- Equipped with one output manual valve for Safety can draining to Blender input.
- Constructed of Brass & Aluminium.

Wall monted safety cans support
Technical Data Sheet BL-034

NITROGEN FUELS DISPENSING SYSTEM

Definition of Fuels Dispensing Systems:
By Fuels Dispensing System we speak about any means able to bring the Fuels, according pressure and flow specifications, to the Blender back sides inputs. This System can be or a gravity model using safety cans placed close above the blender, or a model using Nitrogen pressure to transfer the Fuels from the main drums to the Blender inputs.

Caution: New International Safety Regulation prohibits storage flammables inside an enclosure or storage in non-sage containers in limited quantity. For customers equipped with unapproved Fuels Containers System, we offer in option, Safety Certified containers of 10 to 20 litres for gravity blender supply. Each of them is equipped with a glass level and 2 stainless steel valve for filling and draining. Note that our drains must be connected to safe receiver or customer’s existing approved system. Alternatively, we can supply safe Dispensing System with Nitrogen Fuels transfer at 80 mb pressure, avoiding electrical concern with pumps, and avoiding micro bubbles produced by pumping effect.

NOTE: ANY CUSTOMER DISPENSING FUELS SYSTEM WITH THE FOLLOWING SPECIFICATIONS CAN BE USED WITH OUR BLENDERS RANGES
Maximum Input pressure at Blender input: 90 mb - Minimum flow available at Blender Inputs: 250 ml / minute

Main parts included in Nitrogen Fuels Dispensing system:
Back Plate Wall mounting. Front Plate supporting all the parts. Fuels Slots from 2 up to 6. Each of them with manual valve selection: “Drum to pressure / Drum to vent”. Pressure reducer. Two Relief valves, one set at 300mb, the second set at 350mb. Each slot has two Teflon Stainless Steel Flexible with irreversible colored male Fast Connectors. Each slot is also supplied with Drum Lid equipped with irreversible colored female Fast Connectors and one immersion tube.

Main Features to be respected with fuels dispensing system:
Systems must guarantee Temperature Homogeneity between all fuels:
- Intermediate Safety Fuel Containers above the Blender is one answer.
- If Fuels come straight from the main drums, caution having them in the same location

Physical Fuels properties to take in consideration:
- No pumping to reduce risk of micro bubbles formation in the lines and in the burettes.
- With Nitrogen System less risk of vapors formation on Fuels surface, and less density changes for long term use.
FUELS DISPENSING OPTIONS

OPTION 1:
Safety cans are installed on a shelf on the back, and above the blender. Filling of the burettes with Volume Model, or directly the blended bottle with Gravity models, is done from the safety cans. Pressure at the input is about 70mb. Filling can be done manually or with external little cans via the input valve of the safety can.

NOTE: 12 VDC Fuel transfer pumps system is available. Pumps are controlled from Blenders or via manual switches. System is NOT explosion proof. Details on request.

OPTION 2:
Safety cans are installed on a shelf on the back, and above the blender. Fuels Filling is done from the mains drums each time safety cans are empty. Manual operation.

OPTION 3:
Fuels Filling is done directly to blenders back inputs, with 70mb pressure. Pressure is activated only during filling. "No fuels are stored in the laboratory"

Technical Data Sheet BL-035

<table>
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<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
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</table>

Drums Lid model | Drums of 60 litres | Drums of 120 litres | Drums of 200 litres |
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
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<tbody>
<tr>
<td>Code number</td>
<td>BL_050</td>
<td>BL_051</td>
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</table>
Vérification Certificates Octane Burettes

CERTIFICATE N°2006-0029 - Burette N° : 0029

Conditions of edition of the Verification certificate :
Balance and Mass used to check by gravity the volume of the burette are covered by DKD and/or COFRAC accreditation offices. Documents annexed.
These Certified Tools used for Verification tests are recertified each time necessary according the international rules applied by DKD and/or COFRAC accreditation offices.
Edition of the certificate of Verification is allowed only if results of the verification tests procedure fulfill factory specifications.

Conditions of tests :
Burette volume is checked with distilled water after manufacturing for initial volume approval.
After this initial check, the verification tests are done with bi-distilled water.
The 3 tests of Verification have to be done imperatively successively.
Temperature is recorded during the test procedure, and used for density correction.
Drift of temperature must not be exceeding 1°C during complete test.

Tools used :
- Thermometer with DKD connected certificate N°74865.
- Densimeter
- Bi-distilled water.

Document associated :
- Procedure of edition of verification certificates PO_APP_04

Procedure of test :

Tools to be use for these tests :
Only Verification tools with valid Certification can be used. Before to start verification procedure, check expiration date of the tools certificates. Balance and Thermometer are both required tools.

Procedure of verification:

Each burette is filled up to the maximum. Balance covered by DKD and/or COFRAC accreditation offices is used to weight the volume manually recovered at 200ml (50%), 240ml (60%), 280ml (70%), 320ml (80%), 360ml (90%) and 400ml (100%). This step is repeated 3 times. Bottom of the graduation thickness is used for meniscus control. Average values on 3 tests, Delta between average and temperature compensated value are used to validate the certificate.
Maximum Delta should not exceed ± factory limits. These data's are mentioned on the certificate.

Technical Data Sheet BL-036

Without bulb burette with automatic zero

CETANE Burette
volume = 500 ml

OCTANE Burette
volume = 400 ml

With bulb burette with automatic zero

New burette graduation process
significant precision improvement

BLENDING ACCESSORIES

Dark glass bottles with cork. 500 ml & 1000 ml

Drums and bottles special corks with fast colored irreversible connectors

Fitting / draining & glass level complete assembly.

Safety containers of 10 & 20 litres, fully equipped with fitting / draining & glass level system.

Fitting / draining & glass level different models. One for safety container connected to blender, one for fuels over flow recovery

Teflon stainless steel flexible with colored irreversible fast connectors.

Fitting Transfert Pumps
Fittings, clamps, etc...
Gasoline & Toluene
Flexible tubing
Safety Containers wall support
Safety Containers & Blender Trolley

New burette graduation process
significant precision improvement

Technical Data Sheet BL-036

Please ask for Technical Data Sheet for more details and information. Each unit is supplied with User manual and when required installation and service manual.

For after sales service, based on worldwide Internet system is active. Our representative will supply to you the exact procedure to follow in case of support needs. Our scope being don’t leave our customer without answer or contact within the next 4 working hours.
Semi Automated BLENDERS for OCTANE REFERENCE FUELS preparation
Model OC-04-M
Supplied with Nitrogen Fuels Dispensing System

1. Application:
   - R-023 Batch of material includes the blender with accessories listed below, and the Nitrogen Fuels Dispensing system.
   - Nitrogen Fuels Dispensing System. Nitrogen can be supplied from plant nitrogen supply or from a cylinder (Client decision and supply). Note that pressure must not exceed 5 bars at the input of the Nitrogen Fuels Dispensing System.
   - System allows doing PRF and TSF blends preparation in safe operation and without needs of electrical supply.

2. Blender specifications:
   - Octane reference fuels blender, with 4 burettes, 400 ml, for Iso-octane, N-heptane, Octane 80, Toluene. 400 ml blends preparation.
   - Dimensions: H 1200mm x L 700mm x D 500mm – weight 40 kgs

3. Material supplied with Blender:
   - 3.1 Blender cabinet.
   - 3.2 Four burettes.
   - 3.3 Four Safety Cans (see specifications in annexe).
   - 3.4 One plate support for the 4 Safety cans to be fixed on a wall.
   - 3.5 One drain fuels safety can (placed below the Blender)
   - 3.6 10 Bottles of 1000 ml, amber glass.
   - 3.7 Tygon tubing to connect Fuels Safety cans to Blender and Burettes over flow to safety drain can.

4. Material supplied with the Nitrogen Fuels Supply:
   - 4.1 Frame to be fixed on the wall of a shelter equipped with:
     - 4.1.1 Input manual valve.
     - 4.1.2 Pressure reducer. Maxi input 5 bar / Output 0 to 1 b.
     - 4.1.3 Relief valve (0.3 b).
     - 4.1.4 Four selector valves (one for each fuel).
     - 4.1.5 All fittings to connect the frame to the blenders Input.

Principal of Operation

1.1 Safety Cans fuel filling:
   1.1.1 Check that probe is on screw on the fuel drum and fast connector plugged.
   1.1.2 Open the Nitrogen manual valve to the drum.
   1.1.3 Close the valve on the output safety can valve (fuel to blender).
   1.1.4 Open the input safety can valve and check the glass level.
   1.1.5 When safety can is filled then closes the input valve.
   1.1.6 Re-open the output safety can valve to the blender.
   1.1.7 Close the Nitrogen valve to the drum.

1.2 Blending operation:
   1.2.1 Operator places the bottle in the dedicated front receptacle.
   1.2.2 Front manual valve of the fuel to be filled is placed on Filling.
   1.2.3 When the fuel reach the over flow, valve is closed.
   1.2.4 Operator waits 3 seconds for the burette automatic level filling.
   1.2.5 Then operator drains the appropriate volume according ON value.
   1.2.6 Operator uses the same procedure for the other fuels.
GENERAL WARRANTY CONDITIONS

ROFA FRANCE warrants its products against defects in material or in workmanship, when used under appropriate conditions and in accordance with appropriate operating instructions for a period of no less than One Year from the date of delivery of the products. To avoid forfeiture of the warranty and to allow ROFA FRANCE to be of continuing service to the scientific community, the record of purchase is requested to be returned to ROFA FRANCE by customers or one of its authorized representatives within 30 days of receipt of equipment.

ROFA FRANCE’s sole obligation shall be to repair or to replace at ROFA FRANCE’s option, F.O.B. its plant or locally, without charge, any part(s) that prove defective within the warranty period, providing the customer notifies ROFA FRANCE promptly and in writing of any such defect. Labour is free of charge in our factory and on customer plant. Travel expenses will be charged to customer for Plant customer on site repair by our technicians. Compensation for labour by other than ROFA FRANCE employees will not be ROFA FRANCE’s obligation. Part(s) replacement does not constitute an extension of the original warranty period.

ROFA FRANCE will not assume responsibility for unauthorized product modifications, or for repairs, replacements or modifications negligently or otherwise improperly made or performed by persons other than ROFA FRANCE employees or authorized representatives.

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Octane Number
Cetane Number

According
ASTM D 2699
ASTM D 2700
ASTM D 2885
ASTM D 613

Automated Blenders
With or without
Burettes

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Nitrogen Fuels
Dispensing System

Burettes Certificates

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Technical Data Sheets