

CASELLA

TUFF SERIES

Casella TUFF™ Personal Sampling Pumps



Ideally suited to a wide range of occupational health sampling applications.

The TUFF personal sampling pumps cover a range of applications from simple abatement sampling of lead and asbestos, to more specialised, industrial hygiene monitoring of dusts, fumes and vapours.

Applications

- Measuring dust, fume and vapour exposure
- Abatement sampling of lead and asbestos
- Ideal for use in Mining, Quarrying and Tunnelling
- Sampling dusts in mining operations and pharmaceutical processes
- Sampling chemicals in petro-chemical plants

Key features

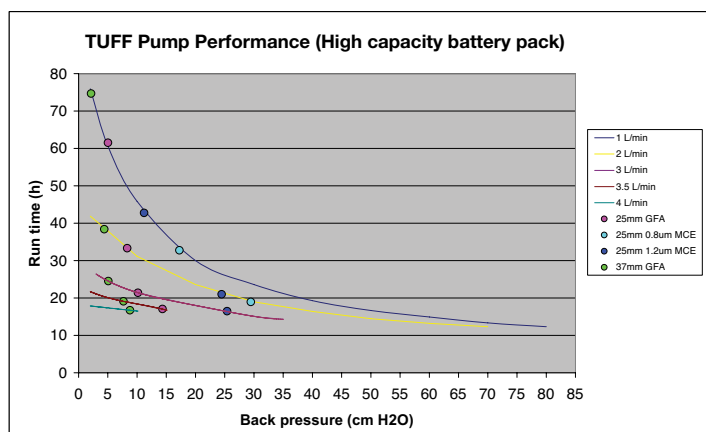
- Robust and reliable design for harsh environments (IP54)
- Visible replaceable inlet filter
- Diagnostic monitoring of pump and battery service life
- Intuitive user interface and menu
- High intensity status/alarm LED's
- IECEX, ATEX listed intrinsically safe models available
- Intrinsically safe models available for mining applications (M1 certified)
- Advanced programming capabilities (Pro variants)
- High or low flow capabilities*

The TUFF range of personal air sampling pumps offer the user an extremely robust, rubber over-moulded unit designed specifically for use in harsh monitoring environments. With the range offering a wide flow rate from 5 ml /min* to 4.5 l /min. The units offer excellent functionality at a competitive price.

TUFF has been ergonomically designed for user comfort with an easy to read display and high intensity alarm LED's for fault indication.

The **TUFF** range meet **EN1232**, **NIOSH 0600**, and the latest requirements of **ISO13137:2013** for personalised sampling pumps in workplace environments.

Flow Performance



The **TUFF** pump incorporates a proven efficient double acting diaphragm pump mechanism with precise digital control. This offers the user excellent real time flow control and stability across a wide range of sampling media.

For deep mine applications latest versions of TUFF delivered from Q4 2013 have an improved pressure corrected performance. This means that they maintain the correct $\pm 5\%$ flow control field and laboratory tested to a depth of 1800m.

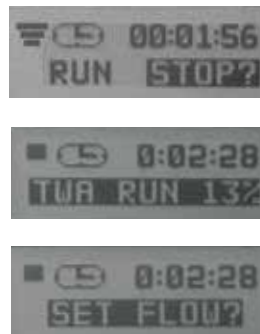
In addition the EN and ISO standards require flow pulsation within $\pm 10\%$ and TUFF meets this with ease (typically $\pm 5\%$) unlike some competitor products, which when tested independently varied from 25-70%.

* Via optional low flow adaptor assembly



User Interface / Display

- Intuitive user interface
- Simple navigation/menu structure
- Display of real time flow, sampled volume and run duration
- Alarm display for flow or battery fault conditions
- 'Fuel gauge' display for battery information
- Lockable keypad



Visible, replaceable inlet filter to protect internal components from dust ingress

Intelligent fuel gauge
Hi visibility LEDs

Intelligent Battery Maintenance and Charging

- Single or three way charger formats
- Allows tidy, compact charging and storage of multiple units.
- Small storage footprint
- Integral Charge Status LED in spare battery packs

The **TUFF** pumps convenient charging cradle allows single or multiple pumps and separate battery packs to be charged. Intelligent battery monitoring and fast / trickle charge control maintains optimum battery condition and service life. Full charge can be obtained in typically less than 5 hours on fast charge.

Embedded battery pack intelligence tracks state of charge, and long term battery condition.



Single battery pack with charge indicator

TUFF Pump Range / Functionality

TUFF pumps are available with either 3 or 4.5 l /min maximum flow rate capability. Standard, Plus and Pro models then provide different levels of functionality and programmability.

TUFF Standard Models:

Entry level pumps for abatement and general sampling applications. With simple single point flow setting, elapsed run time counter and run mode only. Simple battery life indication. Drop in fast charger.

TUFF Plus Models:

Offer additional functionality including: Display of flow set point, real time flow rate, accumulated sample time and volume. Programmable Run Duration mode. Upgradeable to Pro.

TUFF Pro Models:

Offers advanced program functionality and download capabilities suited to the most demanding occupational and industrial hygiene applications. Offers all functionality of the **Plus**

model with the addition of: Intelligent Hours Remaining Battery 'Fuel Gauge', Time Weighted Average (TWA) sampling mode, 2 user defined timer programmes (9 on / off times) and onboard data logging for up to 100 runs with download capability to Casella Insight Data Management Software (see separate data sheet).

Intrinsically Safe (I.S.) Models:

All models within the TUFF range are I.S., and can be used where hazardous atmospheres are present such as flammable gases or dusts. Additional models are available which satisfy the stringent requirements of mining applications that are rated to 'M1' (available on TUFF 4 Pro only).


Battery Packs:


TUFF operates from a removable 4.8V Nickel Metal Hydride (NiMH) rechargeable battery pack with a 2.7Ah capacity.

Specification:

Technical:

Flow Range:	5 ml /min* to 4.5l /min (3l /min on Tuff 3 variant)
Flow Control Accuracy:	Control typical < ±3% at calibrated point
Inlet Pulsation Ratio:	<10% @ 2l /min
Runs Stored:	100 (Pro Versions Only)
Display:	100 x 32 Graphics LCD
Typical Charge Time:	<5hrs from discharge
Size mm:	133 x 87 x 47mm
Weight gm:	480g
Service Interval:	Recommended 2500 hrs
IP Ratings:	Gasket Sealed Case IP54
Intrinsic Safety Approvals:	(IECEx, ATEX, ANZEx)

 I M1
Ex Ia I Ma
Ta = -20°C to +41°C

 II 1G
Ex Ia IIB T3 Ga
Ta = -20°C to +41°C

Environmental:

In storage:	Temperature: -10 to +50°C Humidity: 30-95% RH (non condensing)
In operation:	Temperature: 0 to 45°C Humidity: 30-95% RH (non condensing)
Operation Duration:	@2.0L /min via 25mm GFA filter: >30hrs 2.7Ah / >20hrs 1.7Ah

*via optional low flow adaptor

Ordering Information:

Pumps are configured when ordered via a selection matrix. All part numbers start with the letter 'P', then select the level of intrinsic safety, then select the pump variant you require - either 3 or 4.5 l/min flow range, standard, Plus or Pro variant and select the appropriate prefix. Then add '2' for the high capacity battery. Finally select if charger is required. The corresponding 'P' number is the part number used for ordering.

Product:

31 I.S.
32 M1 Certified
I.S. for Mining

Battery	
High Capacity	2

Charger	
None	0
1way	1

Pumps can be configured to application by completing the matrix:

P	Product	Variant	Battery	Charger
	3 0	x x	x	x

Example: TUFF 4 I.S. with high capacity battery and single way charger will be:

P	3	1	4	1	2	1

Pump Variants:

Tuff 3	31
Tuff 3 Plus	32
Tuff 3 Pro	33
Tuff 4	41
Tuff 4 Plus	42
Tuff 4 Pro	43

Sampling Accessories:

To undertake personal sampling in accordance with local and national sampling methodologies and standards, many different devices and media must be used in conjunction with the TUFF pumps. A comprehensive range of these sampling accessories is available:-

- Sampling Heads, Cyclones
- Bubblers and Impingers, Sorbent Tubes
- Cassettes, pre-treated filters, blank, pre-loaded
- Range of Filter Media
- Sorbent tubes and tube holders

For further advice on sampling methodologies and filter media required, visit our support web page: www.airsamplingsolutions.com. A pre and post sampling advice service is also available via our technical support team.

Rotameters and Calibrators:

It is essential that all personal air sampling pumps are calibrated regularly to ensure compliance to the sampling methodologies. A range of digital calibrators and standard rotameters are available.



Complete monitoring kits available



Other Accessories:

193200B	IR to USB Download Cable	197085B	Three Way Charger
P109032	Low Flow Adaptor Assembly (CPC with single tube holder)	197151B	I.S. High capacity 2.7Ah Battery Pack
197082B	Single Way Charger	197141B	M1 Certified I.S. High Capacity 2.7Ah Battery Pack



TUFF is a registered trademark

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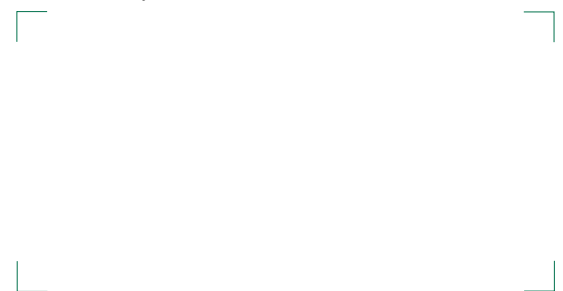
Regent House,
Wolseley Road,
Kempston,
Bedford
MK42 7JY
United Kingdom
Tel: +44 (0) 1234 844100
Fax: +44 (0) 1234 841490
Email: info@casellameasurement.com
Web: www.casellasolutions.com

Ideal Industries India Pvt.Ltd.

229-230, Spazedge,
Tower -B Sohna Road,
Sector-47, Gurgaon-122001,
Haryana (India)
Tel: +91 124 4495100
Casella.Sales@ideal-industries.in

Casella have a continuous product improvement policy and therefore reserve the right to change the specification without notice

Distributed By:



Casella Inc.

a subsidiary of Ideal Industries, Inc.
415 Lawrence Bell Drive, Unit 4
Buffalo,
NY 14221
USA
Toll Free: (800) 366-2966
Tel: (716) 276 3040
Fax: (716) 276 3043
Email: info@casellaUSA.com

Ideal Industries China

Room 1702, Citychamp Building, No.12 Tai
Yang Gong Zhong Lu, Chao Yang District,
Beijing 100028,
China
Tel: 8610-85183141
Fax: 8610-84298061
Email: info@casellameasurement.cn

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