

TUFF™



Personal Sampling Pumps



Introduction

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.

TUFF pumps are ideally suited to a wide range of occupational health sampling applications from simple abatement sampling of lead and asbestos, to more specialised industrial hygiene monitoring of dusts, fumes and vapours. The units offer excellent functionality at a competitive price.

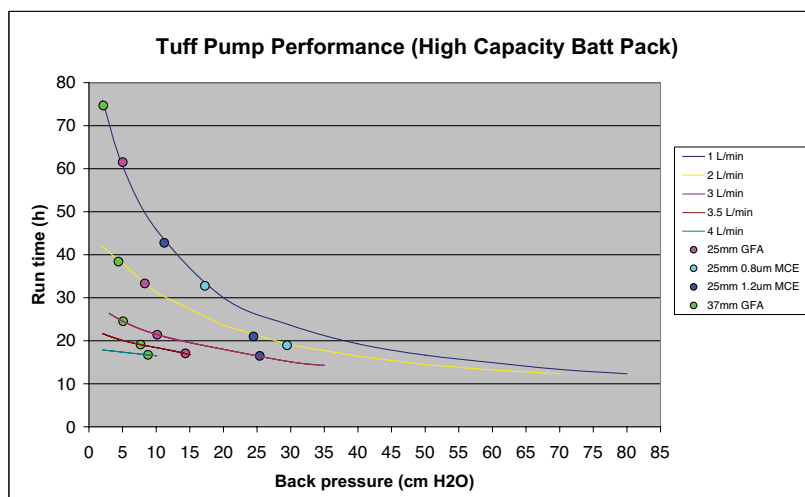
TUFF has been ergonomically designed for user comfort with easy to read display and high intensity alarm LED's for fault indication.

The **TUFF** range meet **EN1232** and **NIOSH 0600** requirements for personalised sampling pumps in workplace environments.

Key Features

- Robust and reliable design for harsh environments (IP54)
- Rubber over-moulded sealed case
- Outstanding operation duration
- Exceptional flow control
- Convenient drop in charging/storage system
- Intelligent battery management
 - Fast battery charge <3 hrs (5hrs on 3way)
 - Removable NiMH battery pack (1.7 or 2.7 Ah)
 - Remaining run time "fuel gauge" (Pro variants)
- 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, ANZEx & FM listed intrinsically safe models available
- Intrinsically safe models available for mining applications (M1 certified)
- Advanced programming capabilities (Pro variants)
- High or low flow capabilities*

Flow Performance

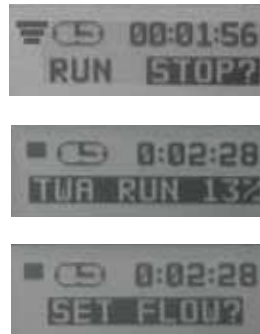


The **TUFF** pump incorporates a proven efficient double acting diaphragm pump mechanism with precise digital control. This offers the user excellent real time flow control and stability across a wide range of sampling media.

* 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

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 or 3 way charger formats
- Allows tidy, compact charging and storage of multiple units.
- Small storage footprint
- Integral Charge Status LED in spare battery packs



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.

Intrinsically Safe (I.S.) Models:

I.S. models are used where hazardous atmospheres can be present from flammable gases or dusts. In this situation, IS models should be used. Additional models are available which satisfy the stringent requirements of mining applications that are rated to 'M1', the only pump in the world to have this level of certification.

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).

Battery Packs:

The units operate from removable 4.8V Nickel Metal Hydride (NiMH) rechargeable cells.


There are two capacities:


1.7Ah standard pack for general short term monitoring applications or the high capacity 2.7Ah versions where longer sampling durations may be required.

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, FM, 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

*with low flow adaptor

ORDERING INFORMATION:

Pumps are configured when ordered via a selection matrix. All part numbers start with the letter 'P', then select if intrinsic safety is required, then select the pump variant you require - either 3 or 4.5 l/min flow range, standard, + or Pro variant and select the appropriate prefix. Then select the battery you require - standard (1.7Ah) or high capacity (2.7Ah). Finally select if charger is required. The corresponding 'P' number is the part number used for ordering.

Product:

30	Non-I.S.
31	I.S.
32	M1 Certified I.S. for Mining

Battery	
No Battery	0
Standard	1
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

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

P	3	0	4	1	2	1
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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	197150B	I.S. Standard 1.7Ah Battery Pack
P109032	Low Flow Adaptor Assembly (CPC with single tube holder)	197151B	I.S. High capacity 2.7Ah Battery Pack
197105B	Spare Battery 1.7Ah	197140B	M1 Certified I.S. Standard 1.7Ah Battery Pack
197088B	Spare Battery 2.7Ah	197141B	M1 Certified I.S. High Capacity 2.7Ah Battery Pack
197082B	Single Way Charger		
197085B	3 Way Charger		
193200B	Infra-Red to USB Download Cable		

TUFF is a registered trademark



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