

**National Personal Protective
Technology Laboratory**

Welcome and NPPTL Overview

Sheraton Station Square

Pittsburgh, PA

Les Boord

December 13, 2005



National Personal Protective Technology Laboratory

**Continued Discussions of Concepts
for Standards for Approval of
Respirators for Use Against
Chemical, Biological, Radiological
and Nuclear Agents (CBRN) and
Concepts for Standards for Industrial
Powered Air Purifying Respirators**

CDC Workplace
Safety and Health

NIOSH

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through Partnerships*

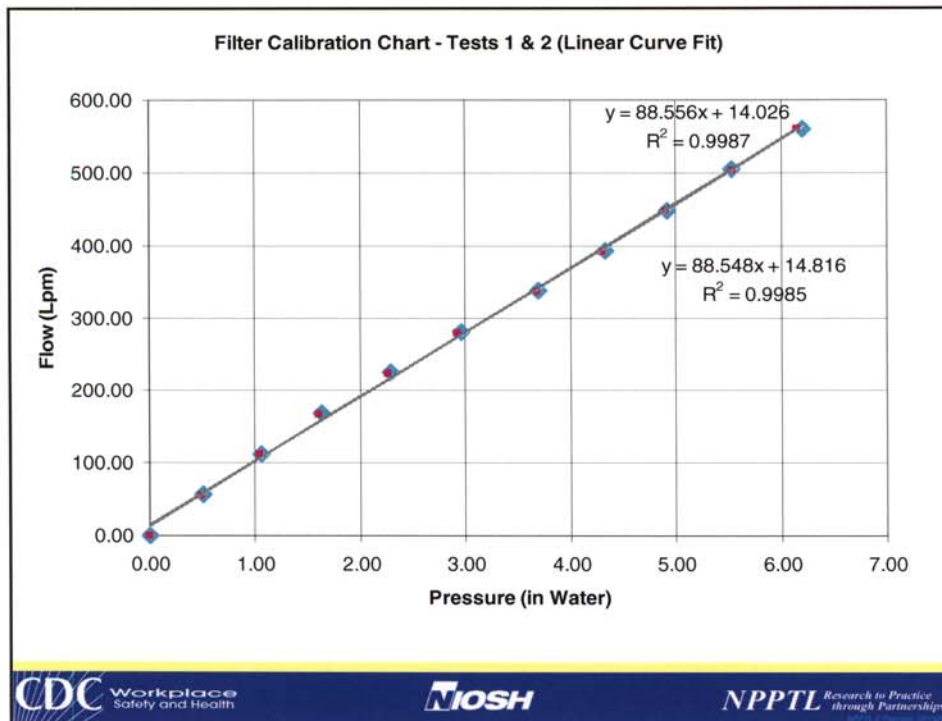
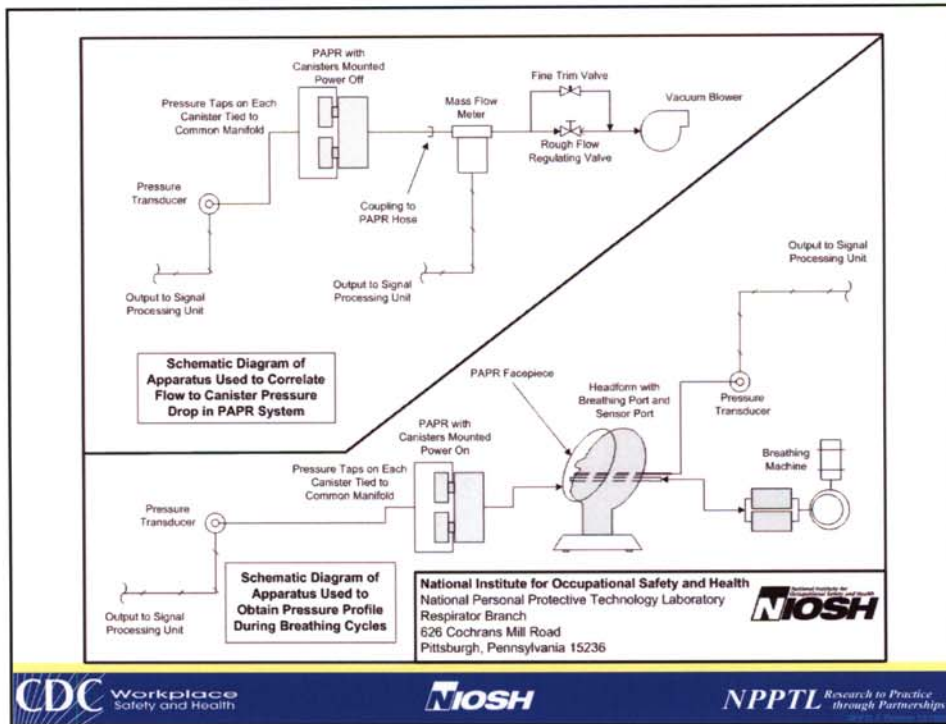
Review of PAPR Air Flow Measurement Technique Discussed at the July '05 Public Meeting

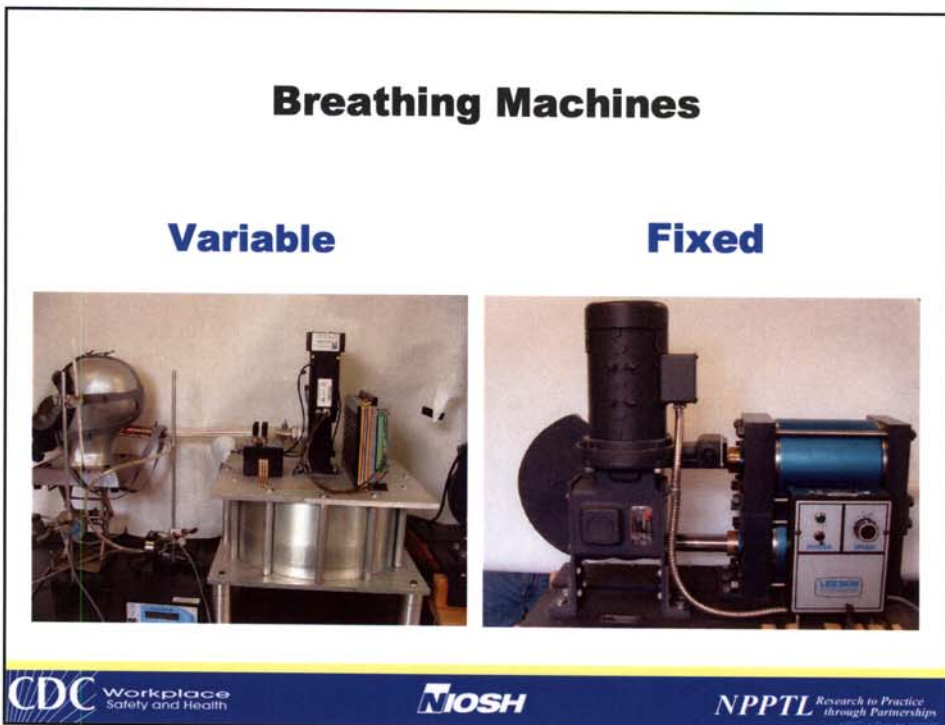
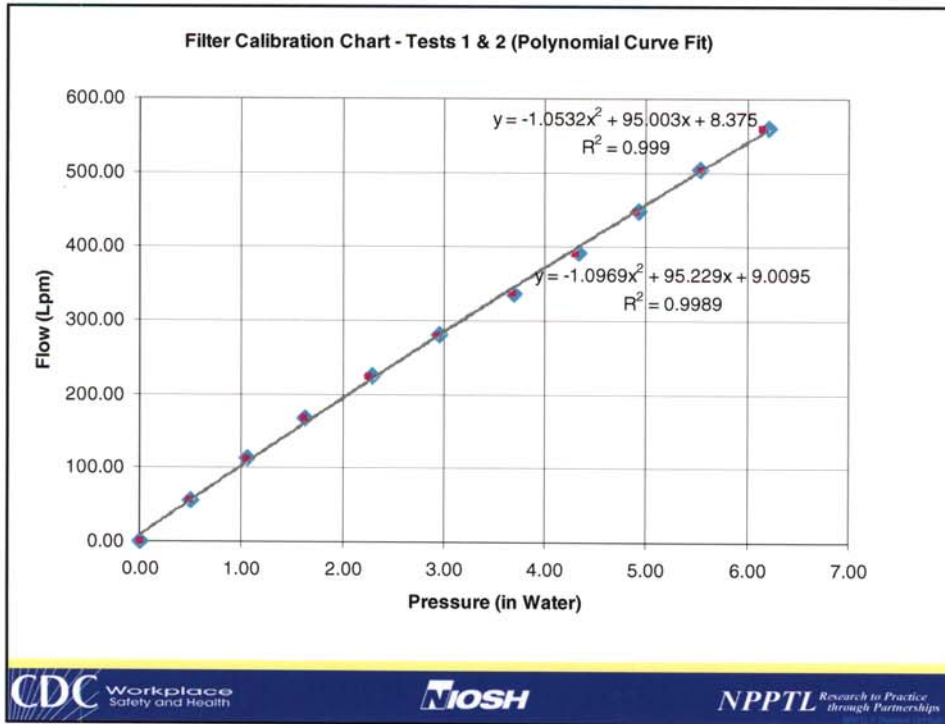


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Table 1—Performance requirements

Parameter	Requirement
CO ₂ concentration of dry breathing gas during inhalation	≤ 4% by volume
O ₂ concentration of dry breathing gas during inhalation	≥ 15% by volume
Wet-bulb temperature of breathing gas during inhalation	≤ 50 °C
Maximum breathing gas pressure	≤ 200 mm, w.g.
Minimum breathing gas pressure	≥ 0 mm, w.g.

Table 2a—Parameters

Parameter	Work load A	Work load B
Ventilation rate, liters/min, at T lung , P local and 100% RH	100	40
Respiratory frequency, breaths/min	30	18
Oxygen consumption rate, liters/min,	3.2	1.35
Carbon dioxide production rate, liters/min,	3.4	1.15

Volumes measured at Standard Temperature = 0 °C and Pressure Dry = 760 mm HG (STPD)

Table 2b—Protocol

Rated duration as established by 42 CFR 84.100	Work load	Starting time (minutes)	Duration (minutes)
Hour 1	A	0	12
	B	12	43
	A	55	5
Hour 2	B	60	25
	A	85	5
	B	90	25
	A	115	5
Hour 3	B	120	25
	A	145	5
	B	150	30
Hour 4 and beyond	B	180	60

Table 3—Environmental test conditions

Environment	Temperature	Test duration	Test procedure
Cold (EBM*)	EBM Temp $\pm 1^{\circ}\text{C}$ (EBM Temp $^{\circ}\text{F} \pm 2^{\circ}\text{F}$)	Cold soak for a minimum of 12 hours	Perform test at EBM Temp $\pm 1^{\circ}\text{C}$ (EBM Temp $^{\circ}\text{F} \pm 2^{\circ}\text{F}$)
Hot	$71^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ($160^{\circ}\text{F} \pm 2^{\circ}\text{F}$)	Hot soak for a minimum of 12 hours	Perform test at $71^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($160^{\circ}\text{F} \pm 10^{\circ}\text{F}$)
Cold temperature shock	$71^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ($160^{\circ}\text{F} \pm 2^{\circ}\text{F}$) transferred to EBM Temp $\pm 1^{\circ}\text{C}$ (EBM Temp $^{\circ}\text{F} \pm 2^{\circ}\text{F}$); Test temperature shall be EBM Temp $\pm 1^{\circ}\text{C}$ (EBM Temp $^{\circ}\text{F} \pm 2^{\circ}\text{F}$)	Hot soak for a minimum of 12 hours; initiate test within 3 minutes in cold chamber	Initiate test within 3 minutes after transferring apparatus to cold chamber
Hot temperature shock	EBM Temp $\pm 1^{\circ}\text{C}$ (EBM Temp $^{\circ}\text{F} \pm 2^{\circ}\text{F}$) transferred to $71^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ($160^{\circ}\text{F} \pm 2^{\circ}\text{F}$); Test temperature shall be $71^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($160^{\circ}\text{F} \pm 10^{\circ}\text{F}$)	Cold soak for a minimum of 12 hours; initiate test within 3 minutes in hot chamber	Initiate test within 3 minutes after transferring apparatus to hot chamber

*EBM - The cold temperature operational limit shall be established by the manufacturer

Table 4—Simultaneous liquid and vapor challenge of SCBA with distilled sulfur mustard (HD)

Agent	Challenge concentration	Duration of challenge (min)	Breathing machine airflow rate (L/min)	Maximum peak excursion (mg/m ³)	Maximum breakthrough (concentration integrated over minimum service life (mg-min/m ³))	Number of systems tested	Minimum service life (hours)
HD-Vapor	300 mg/m ³ ††	30*	30 L/min (STPD) §§	0.60 ‡	6.0 §	3	† ††
HD-Liquid	0.86 mL	Minimum service life					

* Vapor challenge generation will start immediately after the liquid drops have been applied and the test chamber has been sealed

† The test period begins upon the start of initial vapor generation

‡ Three consecutive sequential test data points at or exceeding 0.6 mg/m³ will collectively constitute a failure where each test value is based on a detector sample time of approximately 2 minutes

§ The cumulative Ct, including all peak data points, must not be exceeded for the duration of the minimum service life

†† Minimum service life is equal to applicant's identified duration plus one hour

††† Decay rate of vapor challenge will follow the same profile as the decay rate of the NIOSH CBRN Standard for an Open-Circuit SCBA

§§ Standard temperature 0oC and Pressure Dry 760 mm HG (STPD)EBM - The cold temperature operational limit shall be established by the manufacturer

Table 5—Vapor challenge of SCBA with Sarin (GB)

Agent	Challenge concentration	Duration of challenge (min)	Breathing machine airflow rate (L/min)	Maximum peak excursion (mg/m ³)	Maximum breakthrough (concentration integrated over minimum service life (mg-min/m ³))	Number of systems tested	Minimum service life (hours)
GB-Vapor	2,000 mg/m ³ ††	30*	30 L/min (STPD) §§	0.087 ‡	2.1 §	3	† ††

* The vapor challenge generation will be initiated immediately after test chamber has been sealed

† The test period begins upon initial generation of vapor concentration

‡ Three consecutive sequential test data points at or exceeding 0.087 mg/m³ will collectively constitute a failure where each test value is based on a detector sample time of approximately 2 minutes

§ The cumulative Ct including all peak data points must not be exceeded for the duration of the Minimum Service Life

†† Minimum service life is equal to applicant's identified duration plus one hour

††† Decay rate of vapor challenge will follow the same profile as the decay rate of the NIOSH CBRN Standard for an Open-Circuit SCBA

§§ Standard Temperature 0oC and Pressure Dry 760 mm HG (STPD)

National Institute for Occupational Safety and Health (NIOSH) / National Personal Protective Technology Laboratory (NPPTL)



CBRN Respirator Standards Public Meeting

December 13, 2005

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NORA / NIOSH Program Sectors

- Agriculture, forestry, and fishing
- Construction
- Healthcare and social assistance
- Mining
- Manufacturing
- Services
- Transportation, warehousing, and utilities
- Wholesale and retail trade

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NIOSH Cross-Sector Programs

- Authoritative Recommendations Development
- Cancer, reproductive, cardiovascular, neurologic & renal diseases
- Communications and information dissemination
- Emergency preparedness/response
- Global collaborations
- Health hazard evaluation (HHE)
- Hearing loss prevention
- Immune, dermal and infectious diseases
- Musculoskeletal disorders
- **Personal protective technology**
- Radiation dose reconstruction
- Respiratory diseases
- Training grants
- Traumatic injury
- Work organization and stress-related disorders

NIOSH Coordinated Emphasis Areas

- **Economics**
- **Exposure assessment**
- **Engineering controls**
- **Work life initiative**
- **Occupational health disparities**
- **Small business assistance and outreach**
- **Surveillance**

NORA Town Hall Meetings

Date	Location	Sector
<u>December 5</u>	College Park, Maryland	Transportation, Warehousing and Utilities
<u>December 19</u>	Chicago	Construction
<u>January 17</u>	Seattle	Agriculture, Forestry and Fishing
<u>January 23</u>	Houston	Healthcare & Social Assistance
January 30	Jackson, Mississippi	Regional meeting
February 13	Tampa	Wholesale and Retail Trade
February 17	Iowa	Regional Meeting
February 21	Los Angeles	Public and Private Services
February 27	Salt Lake City	Mining
March 6	Troy, Ohio	Manufacturing
March 13	Washington D.C.	Wrap-Up



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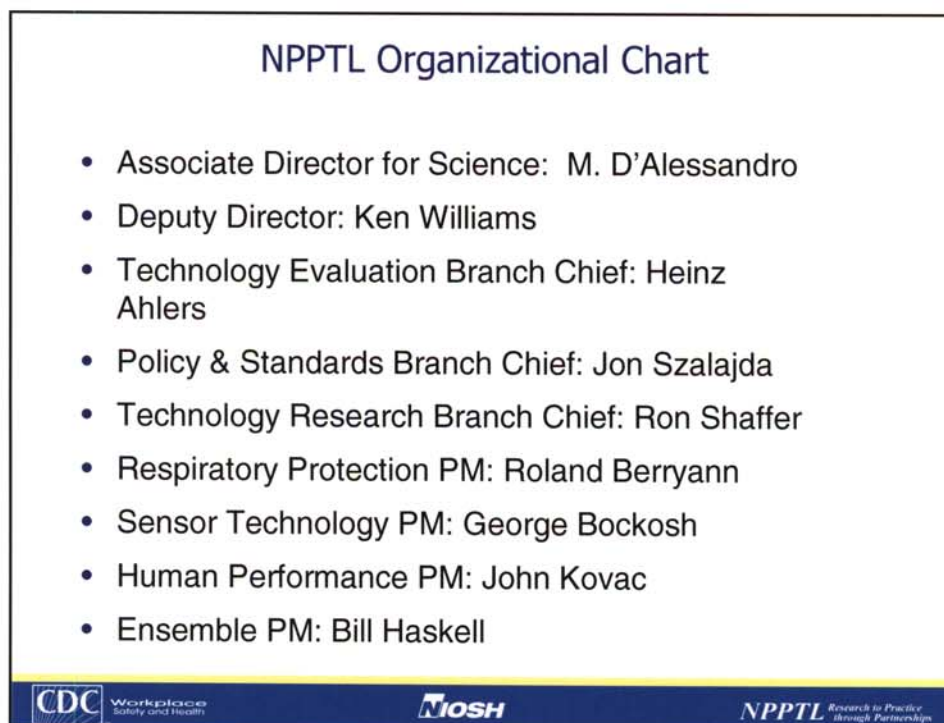
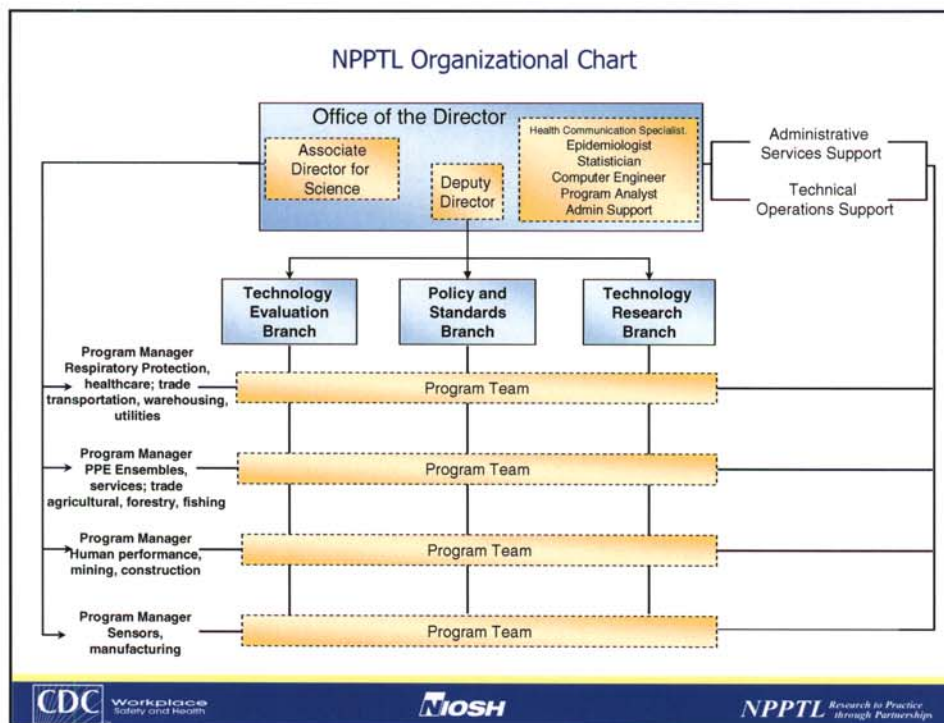
- Office of the Director, NIOSH
- Office of Extramural Programs
- Pittsburgh Research Laboratory (PRL)
- **National Personal Protective Technology Laboratory (NPPTL)**
- Division of Respiratory Disease Studies (DRDS)
- Division of Safety Research (DSR)
- Health Effects Laboratory Division (HELD)
- Education and Information Division (EID)
- Division of Applied Research and Technology (DART)
- Division of Surveillance Hazard Evaluation and Field Studies (DSHEFS)
- Office of Compensation Analysis and Support (OCAS)
- Research to Practice (R2P)
- Spokane Research Laboratory



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CBRN Respirator Certification

- **CBRN SCBA:** 41 approvals issued to 6 manufacturers
- **CBRN SCBA Upgrade:** 11 approvals (retrofit) issued to 2 manufacturers
- **CBRN APR:**
 - 6 approvals issued to 4 manufacturers
 - Additional approvals pending
- **CBRN Escape:**
 - 2 approvals issued to 2 manufacturers



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Customer Relationships and Satisfaction

- **National Academies Involvement in NPPTL**
 - *Committee on PPE for the Workforce (COPPE)*
 - *Review of Anthropometrics Survey and Respirator Panel Modifications*
 - *Next Meeting Feb 9, 2006 Irvine, CA*
 - *Review of BLS Survey of Respirator Use*
- **Customer surveys**
 - *Customer Satisfaction Survey (CSS)*
 - *Point of Service (POS) Surveys*
- **Customer Satisfaction Council**
 - *Council of 9 – 10 Customers*
 - *Council Coordinator: Tom Pouchot*
 - *Meet 3 times annually*
 - *First Meeting Spring 2006*

**Deliberate
and
Systematic
Activities
Proactive vs
Reactive**



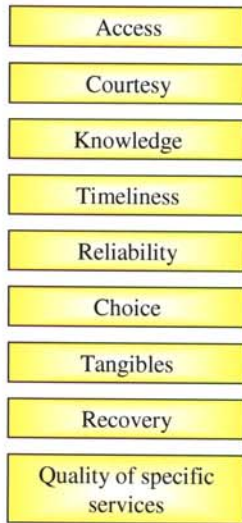
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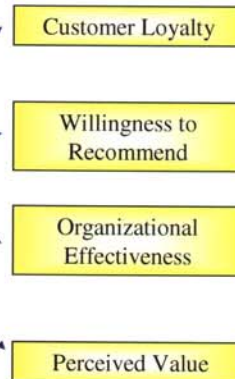
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Customer Service Dimensions and Outcomes

Service Dimensions



Organizational Outcomes



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Quality Partnerships Enhance Worker Safety & Health



Visit Us at: <http://www.cdc.gov/niosh/npptl/default.html>

Thank you



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