Agenda

Second Draft Meeting for NFPA 1581, 1582, 1583, and 1584

Technical Committee on Fire Service Occupational Safety and Health

March 30 through April 3, 2020 0800-1700 hours each day
Telephone / WEB Conference

I. Welcome and call to order – All Days

II. Introductions- members and guests – All Days

III. Review and accept minutes from previous meeting – Day 1

IV. NFPA update – Day 1

V. NFPA 1581 and 1583 second revisions – Day 1

VI. DHS/FEMA EEOC 1582 Speaking request and discussion – Day 2

VII. 1582 second revisions - Day 2, 3

VIII. 1584 second revision day 4,5

IX. Adjournment

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National Fire Protection Association (NFPA)
Fire Service Occupational Safety and Health (FSOSH) Technical Committee Meeting
NFPA 1500 & 1561 Second Draft Meeting
May 6-8, 2019
Nashville, TN

Members Present:
Randy Krause, Chairman
Christina Baxter
David Bernzweig
Sandy Bogucki
Jim Brinkley
Dennis Childress
David Dodson
Stanley Hamies
Tamara Lopes
Joseph McHugh
Steven Moffatt
Charles Popp, III
David Prezant
Daniel Samo
Denise Smith
Donald Stewart
Phil Stittleburg
Fred Terryn
Ronnie Villanueva
Teresa Wann

Alternates and Non-Voting Members Present:
Kurt Becker
Shawn Oke
Jerome Ozog
Ed Hawthorne
Paul Parrish
Jay Tarley

Guests:
Howard Meek – TEEX
Ryan Hatt – Frisco FD

Shawn Brightman – Frisco FD
Kristen Wheldon – Fire Service Psych Association
Kepra Jack - HEARTFIT for Duty
Lauren Kosc - IAFF
Justin Gipson – Chula Vista FD
Margarita Ramis - IAFF
Don Cox – San Antonio Fire Department
John Niemiec - IAFF
Virginia Weaver – John Hopkins (IAFF)

NFPA Staff:
John Montes

Monday May 6, 2019

I. Murrey Loflin, acting chair, called the meeting to order.

II. Members and guests were introduced at the beginning of the meeting.

III. Meeting minutes approved from January Meeting in San Diego

IV. Montes briefed TC on NFPA standards development process.

V. Montes briefed TC on re-organization of FSOSH documents, new contamination standard, and consolidation of emergency responder and responder safety documents.
   a. Technical committee moved to have chair send letter requesting that the standards council reconsider how documents are distributed by FSOSH and the new ER TCs.
   b. Letter sent by Chairman Krause.

VI. Montes clarified that technical committee will complete cycle and work on 1581, 1582, 1583 and 1584. SDM will be in March of 2020.

VII. TC reviewed public comments and created second revisions for NFPA 1500
   a. Montes, warned that they may face scope issues and a NITMAM with the power load cot revisions because it is more aligned with NFPA 1971. And generally speaking these items can cost in excess of $10,000 and the majority of services, both fire based and non-fire based, are not using them. In fact some services have found the additional battery weight to be concerning for when they are lifted by their members.
      i. Technical committee moved to make changes despite the warning.
   b. Montes warned the TC that creating different ballistic protection requirements would likely become a scope issue with the ACT TC. He also stated that the ACT TC may be inclined to formally complain to the council if it moves forward.
      i. The technical committee moved to make the changes despite the warning.

VIII. TC moved to have Montes submit a public comment on their behalf to NFPA 3000 that match new ballistic protective equipment language in 1500.

IX. Meeting adjourned for the day.

Tuesday May 7, 2019

I. Meeting called to order by Murrey Loflin.

II. TC reviewed public comments and created second revisions for NFPA 1500.

III. TC completed work on NFPA 1500 and transition to NFPA 1561

IV. TC reviewed public comments and created second revisions for NFPA 1561.

V. TC Completed work on NFPA 1561.

VI. TC motioned and approved to create a task group for station design health and safety considerations.
    a. Task group consists of the following members:
        i. Dave Bernzweig, Chair
        ii. Keith Tyson
        iii. Charles Popp
        iv. Robert Tutterow
        v. Scott Norwood
        vi. John Nemic
        vii. Fred Terryn
        viii. Paul Erickson

VII. TC reviewed public inputs and created first revisions for NFPA 1584.

VIII. Meeting adjourned for the day.

Wednesday May 8, 2019

I. Meeting called to order by Murrey Loflin.

II. TC reviewed public inputs and created first revisions for NFPA 1584.

III. TC completed work on 1584.

IV. Meeting adjourned by chair.

Fall 2020, (moved from Fall 2019)

Revision Cycle

NFPA 1581

*NO Public Comment Received

Public Comment No. 1-NFPA 1583-2019 [Section No. 6.1.1.1]

6.1.1.1

Members shall discuss any physical limitations or concerns regarding the annual fitness assessment with the health and fitness coordinator or their peer fitness trainer ~~in order to assist with the development of an individual exercise prescription~~ prior to participation .

Statement of Problem and Substantiation for Public Comment

This section of the document is specific to the fitness assessment. Revised statement to reflect this. Original version references the exercise and fitness training program.

Related Item

• No prior public comment

Submitter Information Verification

Submitter Full Name: David Frost
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Submittal Date: Thu Oct 24 10:10:02 EDT 2019
Committee: FIX-AAA

Public Comment No. 2-NFPA 1583-2019 [Section No. 6.1.1.3]

6.1.1.3

The member's medical confidentiality shall be respected by the health and fitness coordinator and their peer fitness trainer .

Statement of Problem and Substantiation for Public Comment

Suggested edit is to maintain consistency with above. PFTs must also maintain confidentiality and may have more interaction with the member than the health and fitness coordinator.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1-NFPA 1583-2019 [Section No. 6.1.1.1]	Both comments mention the PFT and coordinator

Related Item

- FR-6

Submitter Information Verification

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Public Comment No. 3-NFPA 1583-2019 [Section No. 6.4]

6.4* Fitness Assessment Components.

The annual fitness assessments shall consist of the following components:

(1) Body composition
(2) Aerobic capacity and recovery
(3) Speed and power
(4) Muscular strength
(5) Muscular endurance
(6) Mobility and flexibility

Statement of Problem and Substantiation for Public Comment

The updated WFI fitness assessment emphasizes recovery in addition to aerobic capacity

Related Item

• FR-9

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Public Comment No. 4-NFPA 1583-2019 [Section No. 7.1]

7.1* Program Components.

The fire department's exercise and fitness training program, administered by the department health and fitness coordinator and their peer fitness trainer, shall consist of the following components at a minimum:

(1) Educational program that describes the components and the benefits of exercise on performance and health

(2) Individualized exercise programming based on the results of the fitness assessment

(3) Warm-up and cool-down exercise guidelines

(4) Metabolic conditioning program to include aerobic and anaerobic fitness

(5) Muscular resistance (strength, endurance) exercise programming

(6) Flexibility and mobility program

(7) Injury prevention program with focus on the back, ~~knee~~ knees , and ~~shoulder~~ shoulders

Statement of Problem and Substantiation for Public Comment

Two knees and shoulders

Related Item

• FR-10

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Public Comment No. 5-NFPA 1583-2019 [Section No. 8.1.4]

8.1.4

The fire department shall provide education and guidance regarding access to the ~~departments~~ department's member assistance program (MAP) as required by NFPA 1500.

Statement of Problem and Substantiation for Public Comment

Grammar

Related Item

• FR-5

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Public Comment No. 6-NFPA 1583-2019 [Section No. A.4.1.1]

A.4.1.1

The fire department needs to recognize that its members are its most valuable resource. The occupational safety and health program has provided direction on performing assigned functions in a safe manner. The health-related fitness program allows members to enhance and maintain their health and fitness throughout their tenure with the fire department. Education, one provision of a health-related fitness program, is a necessary component for improving health and fitness throughout the organization. The organization needs to provide the recognition and support to ensure the promotion and success of this program. Health and fitness are critical to maintaining the safety of every member.

Data suggest a positive correlation between the following:

(1) A proactive approach to health and fitness and a decrease in debilitating occupational injuries

(2) A reduction in workers'_ compensation claims and a decrease in acute and chronic health problems of firefighters

Combining a proactive health-related fitness program with an occupational safety and health program provides a fire department with the level of quality needed for its members.

The purpose of the health-related fitness program is consistent with the medical requirements and occupational safety and health standards, which is to improve the health fitness and overall well-being of firefighting personnel. Compliance with the standards of NFPA 1500 has demonstrated that, even in the fire service, benefits will ultimately be manifested in cost savings, decreased sick times, and reduced workers' compensation and disability expenses.

A commitment of time and financial resources is necessary to fulfill requirements of this standard. The fire department should afford individual firefighters the means, the facility, and the time, as part of their work-time function, to pursue the health-related goals. Data show that the initial investment of the fire service on behalf of its most valuable resource, the firefighter, will pay significant dividends in the future.

Statement of Problem and Substantiation for Public Comment

Grammar

Related Item

• FR-16

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Public Comment No. 7-NFPA 1583-2019 [Section No. A.4.4.2]

A.4.4.2

The fire department should provide an adequate facility ~~for overall fitness, including maintaining and improving flexibility and mobility, aerobic fitness, muscular strength, and body mechanics~~ to improve body mechanics, aerobic capacity and recovery, speed and power, muscular strength and endurance, and mobility and flexibility , where exercise equipment is centrally located. Such a facility can be developed from the following:

(1) Use of a gym in a commercial facility, high school, university, or other educational institution or private or governmental agency (e.g., military base)

(2) In-house facility equipped through purchased or donated exercise equipment, which can include equipment obtained from the following:

(3) Made in local apprenticeship programs (e.g., welders or pipefitters)

(4) Made at and donated by correctional or educational institutions

(5) Donated by gyms or rehabilitation facilities

(6) Purchased on a shared cost agreement with the governing city, based on a reduced industrial insurance cost for a fitness program

The fire department should maintain equipment owned or leased by the fire department.

Statement of Problem and Substantiation for Public Comment

Change made based on original public comment does not reflect the current edition of the WFI.

Related Item

• FR-17

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Public Comment No. 8-NFPA 1583-2019 [Section No. A.9.1]

A.9.1

The primary purpose for maintaining a health-related fitness program file for each participant is to ~~document health-related fitness information for~~ inform exercise programming and facilitate annual ~~comparison to~~ comparisons with previous results. Comparison of new data to previous results will show an individual's progress in maintaining or improving ~~his or her~~ their level of fitness. Consequently, from analysis and comparison of data, an individual's exercise program can be modified. In addition to measuring a participant's progress and providing information for modification of ~~an individual's~~ their exercise program, analysis of the organization's set of files, or database, will provide information about organizational progress in developing a health-related fitness program and the need for program modification. Along with providing valuable information about the success of the health-related fitness program, maintenance of the database and its subsequent analysis will provide evidence to justify the cost of the program.

Electronic data processing is often employed to facilitate management of such a database. BSDI has been recognized by the IAFF/IAFC *Wellness-Fitness Initiative* as the publisher of appropriate software for documenting health-related fitness information.

Statement of Problem and Substantiation for Public Comment

Suggestion for clarity. 'Their' is also more inclusive than his or hers.

Related Item

• FR-30

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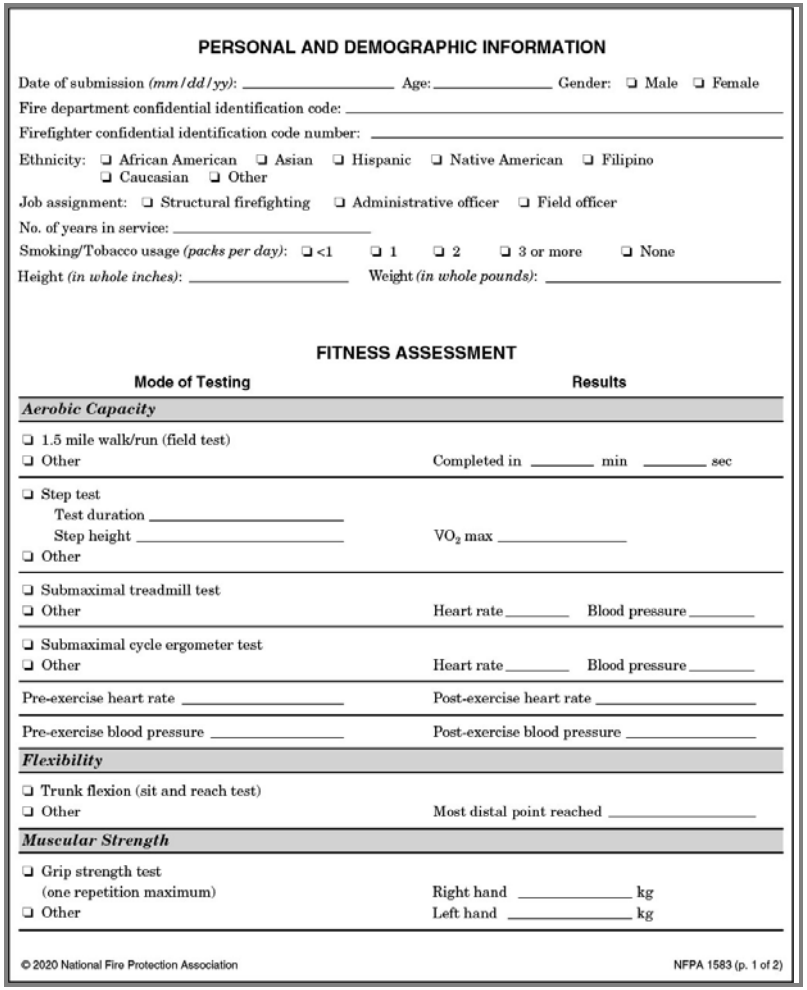
Public Comment No. 9-NFPA 1583-2019 [Section No. A.9.3]

A.9.3

It is recommended that the health-related fitness program file contain demographic information such as age, gender, ethnicity, years of service, and job assignment, as well as information regarding physical capacity such as aerobic capacity, heart rate recovery, strength and endurance, mobility and flexibility, and control of knees and lower back. To ensure consistency and continuity of the process, data should be collected on a standard form such as that shown in Figure A.9.3.

Figure A.9.3 Sample Health-Related Fitness Program Form Showing Demographic and Assessment Information.



PERSONAL AND DEMOGRAPHIC INFORMATION

Date of submission *(mm/dd/yy)*: _____ Age: _____ Gender: ❑ Male ❑ Female

Fire department confidential identification code: _____

Firefighter confidential identification code number: _____

Ethnicity: ❑ African American ❑ Asian ❑ Hispanic ❑ Native American ❑ Filipino ❑ Caucasian ❑ Other

Job assignment: ❑ Structural firefighting ❑ Administrative officer ❑ Field officer

No. of years in service: _____

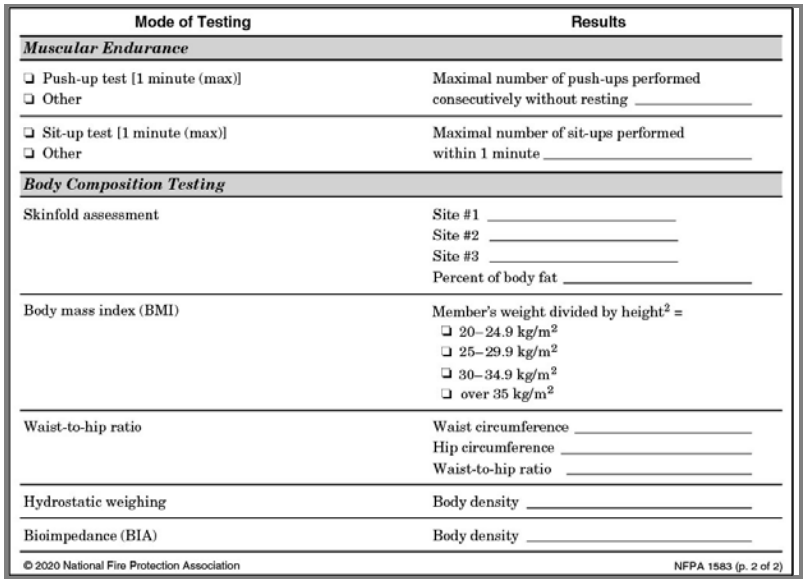
Smoking/Tobacco usage *(packs per day)*: ❑ <1 ❑ 1 ❑ 2 ❑ 3 or more ❑ None

Height *(in whole inches)*: _____ Weight *(in whole pounds)*: _____

FITNESS ASSESSMENT

Mode of Testing	Results
Aerobic Capacity	
❑ 1.5 mile walk/run (field test) ❑ Other	Completed in _____ min _____ sec
❑ Step test Test duration _____ Step height _____ ❑ Other	VO_2 max _____
❑ Submaximal treadmill test ❑ Other	Heart rate _____ Blood pressure _____
❑ Submaximal cycle ergometer test ❑ Other	Heart rate _____ Blood pressure _____
Pre-exercise heart rate _____	Post-exercise heart rate _____
Pre-exercise blood pressure _____	Post-exercise blood pressure _____
Flexibility	
❑ Trunk flexion (sit and reach test) ❑ Other	Most distal point reached _____
Muscular Strength	
❑ Grip strength test (one repetition maximum) ❑ Other	Right hand _____ kg Left hand _____ kg

 NFPA 1583 (p. 1 of 2)



Mode of Testing	Results
Muscular Endurance	
❑ Push-up test [1 minute (max)] ❑ Other	Maximal number of push-ups performed consecutively without resting _____
❑ Sit-up test [1 minute (max)] ❑ Other	Maximal number of sit-ups performed within 1 minute _____
Body Composition Testing	
Skinfold assessment	Site #1 _____ Site #2 _____ Site #3 _____ Percent of body fat _____
Body mass index (BMI)	Member's weight divided by height^2 = ❑ 20–24.9 kg/m^2 ❑ 25–29.9 kg/m^2 ❑ 30–34.9 kg/m^2 ❑ over 35 kg/m^2
Waist-to-hip ratio	Waist circumference _____ Hip circumference _____ Waist-to-hip ratio _____
Hydrostatic weighing	Body density _____
Bioimpedance (BIA)	Body density _____

 NFPA 1583 (p. 2 of 2)

Additional Proposed Changes

File Name	Description	Approved
A.9.3_Sample_Recording_Form.pdf	Sample Recording Form (pdf)	
A.9.3_Sample_Recording_Form.docx	Sample Recording Form (Word)	

Statement of Problem and Substantiation for Public Comment

Updated recording form to reflect changes in WFI and edits made to draft of NFPA 1583

Related Item

• FR-15

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Public Comment No. 10-NFPA 1583-2019 [Section No. B.1]

B.1 ~~Components and~~ _ Benefits of ~~Fitness~~ Exercise .

The ~~health-related components of fitness focus on the importance of maintaining and~~ benefits of exercise extend from physical and mental health to performance, and quality of life. The emphasis of an exercise program should be placed on maintaining or increasing an individual's fitness ~~levels~~ , creating positive lifestyle changes, and enhancing job performance ~~. The motor-related components of fitness improve an individual's athletic endeavors or area(s) of motor performance. Health-related and motor-related components of fitness include the following:~~

(1) ~~Health-related components~~

(2) ~~Aerobic capacity~~

(3) ~~Muscular strength~~

(4) ~~Muscular endurance~~

(5) ~~Flexibility~~

(6) ~~Body composition~~

(7) ~~Motor-related components~~

(8) ~~Coordination~~

(9) ~~Agility~~

(10) ~~Power~~

(11) ~~Balance~~

(12) ~~Speed~~

(i.e. work life and play).

Statement of Problem and Substantiation for Public Comment

Align with the WFI and previous edits in NFPA 1583

Related Item

• FR-15

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Public Comment No. 11-NFPA 1583-2019 [New Section after B.2]

COMPONENTS OF AN EXERCISE PROGRAM

A comprehensive exercise program should be structured to address health, fitness and performance. Areas of emphasis include the following:

(1) Aerobic capacity
(2) Recovery
(3) Speed and power
(4) Muscular strength
(5) Muscular endurance
(6) Mobility and flexibility
(7) Balance
(8) Coordination and Joint stability

Statement of Problem and Substantiation for Public Comment

Split previous section to distinguish the benefits of exercise from the components of an exercise program.

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Public Comment No. 12-NFPA 1583-2019 [Section No. B.2]

~~Targeting the Improvement of~~

B.2 Individualized Exercise ~~Prescription Based on the Fitness Assessment.~~

~~The components of a basic exercise prescription should include the following:~~

(1) ~~*Mode:* type of exercise~~

(2) ~~*Intensity:* difficulty of exercise~~

(3) ~~*Duration:* length of exercise session~~

(4) ~~*Frequency:* number of sessions per day or week~~

(5) ~~*Progression:* gradual increases in workload to promote a training adaptation~~

~~The individualized exercise prescription should take into consideration the following concepts:~~

- ~~*Overload* . To create a training effect, the exercise performed must exceed the load the individual normally experiences. Excessive overload can lead to training injuries; therefore, it is best to underestimate workload and err on the side of safety.~~
- ~~*Progression* . As adaptations to the load take place, the load must be progressively increased in order to continue adaptations and improvements. Programs should progress gradually to avoid overtraining and injuries.~~
- ~~*Specificity* . Overload training leads to adaptations in the muscles and the physiological systems. The adaptations are specific to the manner in which the person trains. This principle of training will be very important for individuals who need to target a specific aspect of fitness.~~

Program

Every exercise program should consider the 4 components of the F.I.T.T. principle.

(1) *Frequency:* How frequent is the exercise exposure? Periodic stress or repeated exposures are needed to elicit physiological adaptations and engrain new movement/fitness behaviors. Must find the balance between too little and too much to meet the exercise objective. Frequency is commonly described by repetitions and sets, or exposures per week.

(2) *Intensity:* How challenging is the exercise exposure? The body must be sufficiently stressed or overloaded to adapt. Must find a balance between too little and too much to meet the exercise objective. Intensity is commonly described by load, tempo (speed), heart rate, and rate of perceived exertion (RPE).

(3) *Time:* How long is the exercise exposure? Certain physiological adaptations require the body to be stressed for specific durations or periods of rest and recovery. Must find a balance between too little and too much to meet the exercise objective. Time is commonly described by the work and rest or the length of the session.

(4) *Type:* What type of exercise exposure? While there are many forms of exercise and physical activity, the body will adapt to the type of stress imposed. The type of exercise(s) should be considered when outlining the training objective. Type is commonly described the modality, contraction type or movement pattern.

General principles to consider when designing any exercise program include the following:

(1) *Performance = Fitness and Movement.* Being physically fit does not equate to being physically prepared for a particular job, sport, or activity of daily living. Fitness is essential, but alone it is not sufficient to ensure peak performance and long-term durability; it simply reflects an individual's potential. Good fitness in the presence of poor body mechanics or good mechanics in the presence of poor fitness will limit performance and increase a firefighter's chances of sustaining a musculoskeletal injury.

(2) *Progression* . The demand imposed must be progressively increased to see further adaptations. However, an individual's body mechanics should be used to guide the progression of their exercise program. Only after they have displayed the capacity to perform (i.e. ability, awareness) should an activity's frequency, intensity and time be modified to make it more challenging. Advancing too quickly may compromise the firefighter's safety and limit the potential benefits of the program.

(3) *Movement matters.* Every movement is the result of the muscular system acting on the skeletal system. Muscles produce force through concentric (shortening), eccentric (lengthening) and isometric (no length change) actions and provide us with an opportunity to perform any number of physical activities. If sufficient force cannot be produced to perform a particular activity today, muscles have the unique ability to grow and become stronger in response to applied stimuli, or demands imposed on the muscular system. However, accurately describing the muscles that are responsible for a given action is not possible. Therefore the decision to use a particular exercise or make a session more demanding should be based largely on the indivdiual's movement patterns and observations made while exercising.

(4) *Exercises are tools.* A individual's capacity will not be improved with just one modality, exercise, or exercise program; there are countless options that will provide an effective training stimulus. Exercises are simply tools that can help to achieve a particular objective. There is also no reason why any specific exercise needs to be included in every program given that almost every individual will perform differently, have a different background and varying personal interests/objectives.

(5) *Long-term adherence* . Enhancing capacity is a process. Firefighters need to be physically prepared to perform safely and effectively today, tomorrow and five years from now. There is no date after which time their capacity to perform becomes more or less important, nor is there opportunity to take advantage of an "off-season". Much consideration should be given to the design of any training program so that it serves to enhance capacity in a manner that is sustainable over an extended period of time. Short- and long-term objectives are needed to effect sustainable change.

(6) *Goal setting.* Exercise can be used to prevent injuries, improve performance and enhance quality of life. But everyone is different, both with regards to their physical demands and their capacity to perform. Without acknowledging these differences and establishing a purpose for training, any exercise-related initiatives to become better physically prepared may be misdirected. This process will require simple, yet sustainable strategies that keep individuals motivated and engaged.

(7) *Emphasize transfer.* Improving job performance does not require that a specific task be replicated in the gym. Many factors can influence the way an indivdual moves (e.g. perception of risk, awareness, strength), and thus a range of physiological, mechanical and behavioural adaptations could, theoretically, be exhibited in response to subtle task differences. Placing an emphasis on “key features” (e.g. control of spine motion) of an activity while exercising will help to alter the habitual patterns of a complex-firefighting skills without having to replicate the exact task.

(8) *Prioritize Health and Fitness* . Programs designed to improve health will not necessarily improve fitness. However, any properly designed exercise training program designed to improve fitness will also have a positive impact on overall health. The *Surgeon General’s Report on Physical Activity and Health* states that physical activity need not be strenuous to improve health, although greater health and fitness benefits can be achieved by increasing the ~~amount of physical activity. Since a high level of physical fitness is essential for safely performing firefighting duties, a fitness program designed for public safety personnel should promote health and a higher level of physical fitness. The workout regimen should include exercises to improve aerobic capacity and muscular fitness components (i.e., strength, endurance, flexibility). Some examples of fireground-specific training include unilateral exercises (lunge versus a squat), unequal or shifting load exercises (sand bag and carry tasks), and periodically (1 to 2 times a month per TSAC) wearing personal protective equipment (PPE) during a workout.~~ time spent physically active.

Statement of Problem and Substantiation for Public Comment

Section needed updating to reflect current literature, 4th edition of the WFI and PFT program.

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Public Comment No. 13-NFPA 1583-2019 [Section No. B.3]

B.3 Warm-Up and ~~Cool-Down Exercise~~ Recovery .

B.3.1~~–~~ _ Warm-Up (Pre-Exercise~~-~~ ~~(Warm-Up~~).

~~Each workout~~

When possible, an exercise session should include

~~at least a~~

a brief (e.g. 5-

~~to~~

10

~~-minute~~

minutes) warm-up period.

~~The purpose of the~~

A warm-up

~~is to increase body temperature while improving the flow of blood and oxygen to the muscles. A warm-up prepares the body for the more strenuous exercise to follow, decreases risk of injury, and improves performance~~

activity serves to prepare the performer for the upcoming bout of physical activity. Although the length, intensity and type can vary, well-structured activities improve readiness via changes to physiological characteristics such as heart rate, ventilation and muscle temperature, and psycholoigical factors such as focus and mental arousal. Warm-up activities also provide an opportunity to rehearse and refine both general and specific movement patterns (or skills) that will be used during the upcoming bout of activity.

When structuring a warm-up the demands of the chosen activities should progress gradually such that when finished, the individual is prepared for the exercise session. Many warm-up sessions include modified or less demanding variations of the exercises that will be performed, and thus can be viewed as “movement preparation” sessions, thereby providing an opportunity to challenge the control of any joint motions that will be needed during the upcoming activity .

B.3.2

_

_ Recovery (Post-Exercise

~~(Cool-Down).A 10- to 15-minute cool-down period should follow each workout. This period includes~~

). When possible, an exercise session should include a brief (e.g. 5-10 minutes) recovery period, characterized by a gradual tapering of exercise intensity

~~followed by~~

and may include active or passive stretching. The purpose of the

~~cool-down~~

recovery activity is to assist in the return of blood to the heart, thereby reducing cardiac stress.

~~Tapering should be followed by stretching of the affected muscles to promote flexibility and~~

Stretching can be used to improve/maintian flexibility and mobility, reduce muscle soreness , and lower mental arousal .

Statement of Problem and Substantiation for Public Comment

Updated to align with current literature, 4th edition of WFI and PFT program.

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Public Comment No. 14-NFPA 1583-2019 [Section No. B.4]

B.4 ~~Aerobic~~ Cardiorespiratory Fitness.

B.4.1 Significance.

~~Aerobic exercise has many benefits, including increased aerobic capacity, muscular endurance, improved bone density, and improved body composition.~~ The *Surgeon General's Report on Physical Activity and Health* ~~found~~ states that inactivity is hazardous to health. ~~Aerobic exercise generally reduces coronary risk factors, muscle fatigue, injuries, and morbidity. Repeatedly, research has shown the need for firefighters to have high levels of aerobic fitness in order to perform their job.~~ Physical activity that imposes a demand on the cardiovascular and respiratory systems will help to improve heart and lung function, while reducing the risk of heart disease, lung cancer, type 2 diabetes, stroke, and other chronic conditions.

B.4.2 Definitions.

B.4.2.1 ~~Aerobic~~ Cardiorespiratory Fitness.

~~Enhancement~~ Cardiorespiratory fitness efers to the ability of the ~~body's ability to take in, transport, and utilize oxygen; improved stamina or ability to carry out muscular activity for a prolonged period of time. Aerobic fitness, also referred to as cardiovascular fitness and cardiorespiratory endurance, is generally measured by the maximal oxygen consumption test (VO~~ 2 ~~max).~~ circulatory and respiratory systems to supply oxygen to skeletal muscles during sustained physical activity .

B.4.2.2 American College of Sports Medicine (ACSM).

~~A national organization of exercise physiologists and health practitioners who review the body of studies on exercise physiology and present exercise testing guidelines as well as exercise prescription recommendations and position statements~~ An association of sports medicine, exercise science, and health and fitness professionals who are dedicated to helping people worldwide live longer, healthier lives. Their mission is to advance and integrate scientific research to provide educational and practical applications of exercise science and sports medicine to the community .

B.4.2.3 Interval Training.

A ~~method~~ type of ~~training~~ exercise in which periods of high-intensity effort (work interval) are alternated with periods of lower ~~training~~ intensity or rest (rest interval). These intervals are performed repeatedly for a given number of ~~repetitions~~ sets . For example, a 1-minute jog (work interval) followed by a 1-minute walk (rest interval), performed a total of 10 times (10 ~~repetitions~~ sets).

B.4.2.4 Karvonen's Formula.

A formula used to predict the heart rates that represent approximately 60 to 85 percent of VO_2 max. This rate is considered an appropriate range to promote ~~aerobic~~ cardiorespiratory fitness improvements.To predict training heart rate, use the following formula [Source: *ACSM's Guidelines for Exercise Testing and Prescription* (Chapter 7)]:

$$HR_{trn} = HR_{max} - HR_{rest} \times \% \text{ intensity} + HR_{rest}$$ [B.4.

~~2.5 Maximal Oxygen Consumption Level~~

4]

where:

HR_{trn} = Training heart rate

HR_{max} = Maximum heart rate = 220 − age

HR_{rest} = Resting heart rate

B.4.2.5 Aerobic capacity (VO_2 max).

The maximal amount of oxygen that can be consumed and utilized per minute. It is measured in milliliters per kilogram of body weight per minute. Direct or gas exchange VO_2 measurement is considered the best indicator of aerobic ~~fitness~~ capacity . Indirect VO_2 testing is a more common method of assessing aerobic ~~fitness~~ capacity , which typically utilizes a formula to predict VO_2 from time and workload.

B.4.3 ~~Aerobic Exercise Prescription.~~ ~~Cardiorespiratory Fitness Programs.~~

The Physical Activity Guidelines for Americans state that for substantial health benefits, adults should do at least 150 minutes of moderate-intensity activity, or 75 minutes of high-intensity aerobic activity per week. Additional health benefits are gained by engaging in physical activity beyond these recommendations.

B.4.3.1

~~– Mode.~~

Activities that utilize large muscle groups in a rhythmical continuous manner (e.g., walking, running, swimming, cycling, rowing, stair climbing, skating, dancing, cross-country skiing, rope skipping, racquetball) are all endurance-based activities. Training can also be carried out in an interval-style fashion. Employing a variety of training modes will reduce the chance of workout boredom and overuse injuries.

Selection of exercise mode should take into consideration the following:

(1) Individual preferences

(2) Availability of proper equipment or facilities

(3) Risk of injury versus benefit of activity

(4) Specificity to occupational demands

Since firefighters need to support their own body weight and the additional load of protective clothing and breathing apparatus, the most job-specific activities will be those that are weight-bearing, such as walking or stair stepping, in contrast to non-weight-bearing activities such as cycling

– Frequency.

How often someone should or will be able to exercise will be related to the intensity and duration of previous sessions, as well as individual time constraints and goals. Individuals with poor fitness or limited experience may benefit by breaking up their physical activity into multiple short duration bouts throughout the day (3 x 5 minutes). Performing some form a physical activity that challenges the cardiovascular and the respiratory systems on most days of the week is recommended .

B.4.3.2 – Intensity.

How hard an individual exercises
The intensity of an exercise session can be determined

by monitoring exercise
via heart rate, rate of perceived exertion

, or caloric expenditure
(RPE) . The American College of Sports Medicine (ACSM) recommends exercising at a heart rate between 70 and 90 percent of maximal heart rate or 60 to 85 percent of VO_2 max,

or heart rate reserve.
as determined by Karvonen's

formula
Formula (

see
B.4.4)

can be used to calculate the heart rate range that represents approximately 60 to 85 percent of one's VO_2 max

.

An alternative to this approach calculates a straight percentage (70 percent to 90 percent) of maximal heart rate.
If the maximal heart rate is unknown, it can be predicted by subtracting age from

the constant
220.

A second calculation method uses the perception of exertion to determine proper intensity of exercise; exercise should be "somewhat hard" to

"hard."

A third method for determining exercise intensity calculates the number of calories burned per minute for a given exercise or for a total exercise period. Generally speaking, activities that burn fewer than 10 calories per minute would represent a low-to-moderate intensity, and activities that burn more than 10 calories per minute would be considered high intensity.

B.4.4 – Karvonen's Formula.

To predict training heart rate, use the following formula [Source: *ACSM's Guidelines for Exercise Testing and Prescription* (Chapter 7)]:

$$HR_{trn} = HR_{max} - HR_{rest} \times \% \text{ intensity} + HR_{rest} \quad \textbf{[B.4.4]}$$

where:

HR_{trn} = Training heart rate

HR_{max} = Maximum heart rate = 220 − age

HR_{rest} = Resting heart rate

When determining the proper intensity of exercise, the following must be considered:

(1) Level of fitness

(2) Medications that affect heart rate

(3) Environmental conditions

(4) Risk of cardiovascular or orthopedic injury

(5) Individual objectives and preferences

(6) Job specificity

Studies evaluating firefighters' heart rate response to fireground activities find that heart rates range from 80 to 90 percent of maximal heart rate or 70 to 80 percent of VO_2 max. Therefore, a firefighter should consider progressing to a an exercuse program that includes some high-intensity efforts.

B.4.

5 Duration.

3.3 – Time.

The duration of

the workout can be determined by time, distance, or calories expended. Exercise duration is integrally related to an exercise session will depend largely on the exercise intensity,

and together they determine goals of the perform and time available. The combination of time and intensity will influence an individual's rate of perceived exertion (RPE) and the total number of calories burned

in an exercise session. Total caloric expenditure can also be used to help determine exercise intensity and duration.The . Although the ACSM recommends 20 to 60 minutes of continuous activity,

excluding the warm-up and cool-down periods. Unfit individuals can benefit from multiple sessions of less than 10 minutes until they are able to withstand training of a longer duration shorter bouts of high intensity activity (e.g. 5 minutes) have shown to elicit similar health benefits to longer duration, low intensity activity .

B.4.

6 Frequency.

Exercise frequency is related to the intensity and duration of the exercise program as well as to individual time constraints and goals. Persons with very low fitness levels will benefit from multiple workouts per day, because they have to exercise at a low intensity and short duration due to lack of fitness. Two to three short workouts per day could be most appropriate. The ACSM recommends a minimum of three aerobic workouts per week to improve fitness and two sessions per week to maintain current fitness levels. Workouts should be performed on nonconsecutive days in order to allow adequate recovery between sessions. Weight training exercises can be performed on the days following the aerobic workout.

B.4.7 – Weekly Caloric Expenditure.

One goal of an exercise program can be a reduction in body fat.

3.4 – Type

There are an infinite number of options that can be chosen to elicity cardiorespiratory benefits. Activities that involve large muscle groups (e.g. running, swimming, weight training circuit) are recommended, but consideration should also be given to the following:

(1) Individual preferences

(2) Availability of proper equipment or facilities

(3) Risk of injury versus benefit of activity

(4) Specificity to occupational demands

Since firefighters need to support their own body weight and the additional load of protective clothing and breathing apparatus, the most job-specific activities will be those that are weight-bearing, such as walking or stair stepping, in contrast to non-weight-bearing activities such as cycling.

B.4.4 Weekly Caloric Expenditure.

The total weekly caloric expenditure, which is determined by exercise frequency, intensity,

~~duration, frequency, and mode,~~

time and type can also be used

~~as a tool to determine the exercise prescription~~

to inform recommendations and monitor progress, particularly when the aim is weight loss . The ACSM recommends a minimal caloric expenditure of 300 calories per exercise session performed three times a week or 200 calories per session performed four times a week. The *Surgeon General's Report on Physical Activity and Health* recommends an accumulated exercise expenditure of 1000 calories per week

~~to improve~~

for health.

~~A more optimal level to improve performance is an expenditure of 2000 calories a week.~~

B.4.

~~8 Rate of~~

5 Progression.

According to the ACSM, the following considerations should be made when determining ~~the proper rate of progression for~~ how to progress an individual 's exercise program :

(1) Medical, health, and coronary risk status
(2) Functional capacity
(3) Musculoskeletal conditions
(4) Age
(5) Individual goals and preferences
(6) Specificity to occupational demands

~~Progressions~~ Progression can come in the form of ~~increases in~~ a change to the frequency, intensity, ~~duration,~~ time and ~~frequency, or a change in mode of exercise (e.g., running instead of cycling). Progressions~~ /or type of activity, but should be gradual to avoid ~~training injuries~~ injury .

Statement of Problem and Substantiation for Public Comment

Updated to reflect literature, 4th edition of WFI and PFT program

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Public Comment No. 15-NFPA 1583-2019 [Section No. B.5]

B.5 ~~Muscle~~ Musculoskeletal Fitness.

B.5.1 Significance.

~~Components of muscle fitness include muscular strength, endurance, and flexibility. The demands of fire fighting require an above-average level of muscular strength and endurance. Increases in bone, muscle, and connective tissue strength and density decrease the risk of soft tissue injuries. Firefighters have to be able to pull, drag, and carry heavy loads. Improved muscular fitness will improve job performance and decrease the likelihood of injuries~~ The *Surgeon General's Report on Physical Activity and Health* states that inactivity is hazardous to health. Physical activity that imposes a demand on the muscular and skeletal systems will help to increase bone mineral density (reduced risk of osteoporosis), enhance mobility and flexibility, improve glucose tolerance, reduce coronary risk factors, and make it easier to perform activities of daily living .

B.5.2 Definitions.

B.5.2.1 ~~Maximal Voluntary Contraction (MVC).~~

~~Maximal amount of weight that can be lifted in a single voluntary muscular contraction.~~

~~B.5.2.2~~ Muscular Endurance.

The ability ~~of the muscle~~ to perform ~~repeated contraction~~ an activity that imposes a demand on the musculoskeletal system for a prolonged period of time~~; the ability of the muscle to persist~~ .

~~B.5.2.3~~ 2 Muscular Strength.

The ~~maximal amount of force a muscle or group of muscles can exert in a single contraction; the ability to apply force~~ abiliity to generate muscular force via the coordinated contraction of one or multiple muscle groups .

B.5.2.4 3 National Strength and Conditioning Association (NSCA).

~~A national~~ An association of ~~exercise physiologist and health professionals who review the body of information generated on muscle fitness training and provide recommendations and position statements for exercise testing protocols and training programs~~ researchers, educators, strength coaches, personal trainers, and other professionals devoted to helping others discover and maximize their strengths. The NSCA disseminates research-based knowledge and its practical application by offering industry-leading certifications, research journals, career development services, and continuing education opportunities .

B.5.2. ~~5 Repetition Maximal (RM).~~

~~The maximal number of repetitions that can be completed with a given weight. For example, if 150 lb (68 kg) is a 10 RM load on the bench press, a person could lift 150 lb (68 kg) at least 10 times but no more than 10 times, using proper lifting form~~

4 Repetition.

One complete movement of a particular exercise, that may involve the eccentric (i.e. lengthening), concentric (i.e. shortening) and/or isometric (i.e. no motion) contraction of one or more muscle groups.

B.5.2.5 Set.

A series of repetitions completed.

B.5.2.6 Load

The resistance provided to challenge the musculoskeletal system. May include weight, elastic tension, pneumatic resistance, friction, etc .

B.5.2.

~~6 Repetition (Rep).~~

~~The lifting and then lowering of a weight~~

7 Tempo.

The movement speed used to perform the activity. Can be used to describe a specific pace or cadence for part or all of the movement .

B.5.2.

~~7 Rest Interval~~

8 Work Duration.

The length of time that work is being done by the musculoskeletal system before rest is permitted.

B.5.2.5 Rest Duration .

The period of

~~rest that could include stretching or light activity between sets and different exercises. *(See B.4.2.3 , Interval Training.)*~~

time between consective repetitions or consecutive sets . Can be passive (i.e. no activity) or active (i.e. alternate activity).

B.5.2. ~~8 Set.~~

~~A series of repetitions completed without rest.~~

5 Repetition Maximum (RM).

The maximum load that can be lifted for a given number of repetitions. For example, a 10 RM would describe the load that could be used to perform 10 repetitions. A 1RM is commonly used to describe the load that can be lifted once.

B.5.3

~~Muscular~~

Musculoskeletal Fitness Exercise

~~Prescription.~~

Program .

The Physical Activity Guidelines for Americans state that for substantial health benefits, adults should do at least 150 minutes of moderate-intensity activity, or 75 minutes of high-intensity activity per week. At a minimum, adults should integrate muscle-strengthening activities that involve all major muscle groups on 2 days per week to experience the associated health benefits.

B.5.3.1

~~Mode.~~

Free weights, machine weights, circuit training, and calisthenics using body weight or tools and equipment from the fireground (e.g., hose, ladder, bundles), or anything that provides a resistance that the muscles have to overcome can be used to improve muscle fitness. The exercise modalities given here will be separated into the following four groups:

- *Free Weights.* Use of free weights (e.g., dumbbells and barbells) requires a balance between the individual and the weight during lifting, which results in a greater use of muscles and the development of better coordination during forceful exertions. Balancing the individual and the weight improves strength transfer to real-life movements, whether for recreational, sport, or work activities. Free weights generally are less expensive to purchase and maintain. A spotter is necessary in several lifts, and the risk of injury can be more serious.
- *Circuit Weight Training.* This regimen is a type of interval training in which strength, local muscle endurance, cardiorespiratory endurance, and reductions in body fat can be accomplished. Free weights, machine weights, and calisthenics can be used in a circuit. Participants perform a series of exercises organized to work all the major muscle groups. The lifting or work period will be 15 to 30 seconds long, and rest intervals between exercises will vary from 15 seconds to 1 minute, depending on which element of fitness is to be emphasized.
- *Machine Weights.* Machine weights provide improved convenience of lifting and safety, and they are easier to learn to use than free weights. Additionally, spotters are not necessary. Machine weights do not simulate the real-life lifting situation as well as free weights, but they do improve muscular fitness, which in turn should improve a firefighter's ability to lift effectively and safely on the fireground. Machine weights are more expensive to purchase and maintain than free weights.

Calisthenics. Calisthenics use an individual's body weight to provide resistance to the muscles. Although no special equipment is required and calisthenics are generally quite safe to perform, resistance is limited by an individual's body weight. Therefore, calisthenics are not necessarily as effective for improvements in strength. Job-specific tasks such as pulling a hose or raising a ladder are very specific to job tasks. However, they are not as convenient or safe to use for all training purposes. The load or intensity is often difficult to control or manipulate

– Frequency.

According to the NSCA, changes in musculoskeletal health or perforamnce can be achieved in as little as 2 days per week. However, the ideal frequency of training will also depend on factors such as the performers' physical capacity, goals, health status, intensity and duration of exercise sessions, and the type of activities being performed.

In general, when designing strength-oriented exercise sessions, higher loads and lower rep ranges are recommended. Because fewer reps are performed, the number of sets used can also be increased. In contrast, when designing endurance-oriented training sessions, lighter loads and higher rep ranges are recommended. If more reps are performed, the number of sets will typically be reduced.

B.5.3.2 – Intensity.

In general, increasing strength requires progressive overload, or continual increases in load. As the load is increased relative to the performer's maximal strength, the movement speed (i.e. tempo) at which it can be moved will also decrease. High loads and moderate to slow tempos are recommended when attempting to increaes strength. In contast, to improve muscular endurance and perform an activity for an extended period of time will require a submaximal load. Because it is more challenging to sustain high speed movements for long durations, slow to moderate tempos are also recommended .

B.5.3.

2 Exercise Selection.

~~A combination of all of the modes of training described in B.5.3.1 can be the most beneficial, especially for a firefighter who needs to train specifically for job tasks but who also desires a safe and convenient exercise program. Regardless of what mode of training is used, a program should be balanced and complete. A minimum of one exercise should be included for each of the following movements:~~

(1) ~~Upper-body push~~

(2) ~~Upper-body pull~~

(3) ~~Lower-body thrust and extension using the hip and knee joint~~

(4) ~~Knee flexion (hamstrings)~~

(5) ~~Anterior trunk (abdominal)~~

(6) ~~Posterior trunk (lower back)~~

B.5.3.3 – ~~Intensity.~~

~~Using the principle of repetition maximal (RM), the weight or resistance should be such that at least 5 repetitions can be completed, but no more than 20 repetitions can be performed, with a given weight (5–20 RM).~~

~~Exceptions would occur during warm-up sets and sets performed by novice lifters, as well as those returning from an injury or individuals with a low fitness level. These types of sets can be performed with lighter loads that would allow more repetitions as follows:~~

(1) ~~To emphasize the development of strength, a weight that allows 5 to 8 repetitions, or is a 5–8 RM load, should be used. Complete 3 to 6 sets of each exercise.~~

(2) ~~To emphasize the development of muscular endurance, a weight that allows a minimum of 10 repetitions, or a 10 RM load, should be used. Complete 3 to 6 sets of each exercise.~~

(3) ~~To emphasize proper warm-up, a light weight that allows 8 to 10 repetitions should be used. Complete 1 to 2 warm-up sets for each exercise.~~

B.5.3.4 – Duration.

The total volume of training (i.e., number of exercises, repetitions, and sets completed) should determine exercise duration, which can last from 20 to 90 minutes. The mode of training can also be a factor in determining duration. Circuit training and the use of weight machines can provide a faster workout

4 _ Time.

The exercise frequency, intensity and type will influence the total exercise duration. In general, when designing strength-oriented exercise sessions, fatigue should be avoided and thus longer rest periods will be needed. Submaximal strength objectives will need less rest. Because the primary objective for most endurance applications is to perform for an extended period of time, long durations will be needed to impose the desired stimulus. Shorter rest periods and higher work to rest ratios (i.e. work duration lasts longer than rest period) are recommended.

With regards to the rest period between consecutive bouts of activity, both passive and active recovery will be necessary to enhance or maintain capacity. Passive recovery refers to time off from physical activity, whereas active recovery is typically characterized by modifying the demands (F.I.T.T. and RPE) of the exercise sessions. Immediately following an exercise session, an individual's capacity will decline. With adequate rest, their capacity will return to and surpass their baseline scores. A second training session can then be administered. If adequate rest is not provided because of the number, volume and/or intensity of training sessions, the performer may experience excess fatigue, soreness or a decrease in performance, and continue to regress over time .

B.5.3.

5 – Rest Interval Between Workouts.

A minimum of 48 hours between workouts of the same muscle should be allowed. Exceptions include the forearms, calf, and abdominal muscles, which can be exercised more frequently.

B.5.3.6 – Rest Interval Between Sets and Exercises.

More rest between sets and exercises is needed at the beginning of a program, after an injury, during a multijoint lift

1 – Type.

Barbells, dumbbells, Kettlebells, elastic bands, ropes, machines, body weight, and tools and equipment from the fireground (e.g. hose , squat ladder, bundles),

or when lifting heavier weights to emphasize strength. The following guidelines can be used to determine rest intervals between sets and exercises:

(1) *Strength:* 2 to 3 minutes of rest between sets and exercises

(2) *Endurance:* 30 seconds to 2 minutes of rest between sets

(3) *Circuit program:* 15 to 30 seconds of rest between exercises

B.5.3.7 – Training Frequency.

The ACSM recommends that a minimum of 2 days per week be devoted to muscular fitness training. According to NSCA, improvements can be achieved at a frequency of 2 days per week, but 3 alternating days per week is superior to other training frequencies. Generally speaking, persons who are in good health, have a good training background, and desire muscular endurance and hypertrophy should engage in more frequent training. Persons of questionable health, limited training background, or engaging in heavy training using multijoint exercises designed to increase strength and high-intensity power should train less frequently. Two or more training sessions a week are required to maintain or make gains. The frequency of training depends on all of the following factors:

(1) Initial level of conditioning

(2) Individual goals

(3) Health status of the athlete

(4) Volume and load of exercises

(5) Type of movement performed (multijoint vs. single-joint)

load the musculoskeletal system. resistance that the muscles have to overcome can be used to improve muscle fitness. A combination of all modalities listed may be the most beneficial for a firefighter who would like to improve health, fitness and job performance, but enjoys diversity. Regardless of the modality used, an exercise program should incorporate all 5 general movement patterns and challenge the 7 key movement features to maximize the transferene to relevant activities at work or otherwise.

5 Movement Patterns

(1) Push pattern (asymmetrical and symmetrical shoulder flexion and extension in horizontal and vertical plane)

(2) Pull pattern (asymmetrical and symmetrical shoulder flexion and extension in horizontal and vertical plane)

(3) Squat pattern (combination of ankle dorsiflexion, knee flexion and hip flexion)

(4) Hinge pattern (hip flexion)

(5) Lunge pattern (asymmetrical ankle dorsiflexion and plantar flexion, and hip flexion and extension)

B.5.3.8

~~Rate of~~

_ Progression.

~~All exercise programs should start gradually in order to ease through the initial stages of the body's adaptation to the stress of exercise. Resistance training is no exception, as it follows the same stages described in the aerobic training section. *(See B.4.8 .)* However, the method of increasing the workout will include one or more of the following factors:~~

(1) ~~Increased resistance (weight)~~

(2) ~~Increased repetitions~~

(3) ~~Increased sets~~

(4) ~~Decreased rest interval between sets~~

(5) ~~Increased frequency of training~~

(6) ~~Change in exercises or training mode~~

The same considerations described previously for cardiorespirtory fitness programs should be made when designing musculoskeletal fitness programs (e.g. medical history, physical capacity, goals, etc). Depending on the training objectives any of the following F.I.T.T. variables can also be manipulated to impose a greater demand: reps, sets, load, tempo, work period, rest period, exercise, modality.

Statement of Problem and Substantiation for Public Comment

Updated to reflect current literature, 4th edition of the WFI and PFT program.

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Public Comment No. 16-NFPA 1583-2019 [Section No. B.6]

B.6 ~~–~~ _ Mobility and _ Flexibility~~.~~

B.6.1 Significance.

~~Flexibility measures the range of motion in a joint, which depends on the extensibility of soft tissues~~
On any given day, the way we walk, get of bed, put on our pants, etc. will be influenced by how much joint range of motion we have (passive) and access (active) through the coordinated contraction of our muscles. Despite vast differences in our population's physical activity and lifestyle habits, and thus the physical capacity _ (e.g.

~~, muscles, tendons, ligaments). Lack of flexibility can hinder physical performance or contribute to an increased risk of injury. Benefits of stretching include the following:~~

(1) ~~Relaxation from stress and tension~~

(2) ~~Improved circulation~~

(3) ~~Relief of lower back pain~~

(4) ~~Relief of muscle soreness~~

(5) ~~Improved coordination~~

(6) ~~Improved job performance~~

(7) ~~Reduced risk of injury~~

strength, aerobic capacity) required to perform safely and effectively, we all need mobility. The ability to move our joints and position our body segments so that we can sit on a toilet, wash our hair, walk up stairs or tie our shoes transcends any differences that may exist in our physical demands.

B.6.2 Definitions.

B.6.2.1 – ~~Static Stretch.~~

~~A slow, gradual, constant stretch in which the end position is held for 10 seconds or longer. Static stretching is easy to learn, safe, and effective and is the recommended stretching mode for firefighters~~

Mobility

Mobility can be described as the extent to which a joint can be moved through a range of motion. Mobility may be influenced by functional (i.e. muscles, tendons) and structural constraints.

Passive mobility refers to the motion observed at a joint when a body segment is moved by an external force, such as the actions of a Peer Fitness Trainer, thus removing any involvement from the muscles. When a segment is moved passively in the direction of interest, the tissues spanning the joint will be lengthened until reaching their physiological limit, at which point no further motion can be achieved – the passive limit has been reached.

Active mobility refers to motion observed at a joint when a body segment is moved by muscular contraction (i.e. internal forces). Active mobility can be isolated to a single joint, or observed in the context of a multi-joint movement, but in either case additional factors such as strength, awareness and coordination, along with the passive extensibility of the muscles, will influence the motion observed about the joint of interest .

B.6.2.2 – ~~Ballistic Stretch.~~

~~A bouncing movement in which the end position is not held. Ballistic stretching involves a dynamic movement to create a rapid stretch of the muscles. It involves the same types of stretches utilized in static stretching, but it uses rapid or bouncing movements to elongate the muscle. Ballistic stretching can produce injuries to muscles or connective tissue, especially when a previous injury is involved.~~

Flexibility

Flexiblity can be described as the extent to which a joint's range of motion is constrained by the muscles and tendons that span it. An individual's flexible (e.g. muscle compliance) will influence their joint mobility.

B.6.2.3 Passive Stretching.

Passive stretching refers to protocols whereby gravity, a piece of equipment (e.g. rope), or a second individual moves the performer through a particular range while their muscles are relaxed.

B.6.2.4 Active Stretching

Active stretching implies that the performer is actively using their muscles to move themselves through a particular range of motion.

B.6.2. ~~3~~ – ~~Dynamic Stretch.~~

~~Stretching utilizing movement, but including sports-specific movements or simulating a movement pattern used in an activity. Dynamic stretching can be beneficial to include in warm-up after muscles are warm and static stretching has been completed. Ballistic or dynamic stretching should not be substituted for the static mode.~~

5 Static Stretching.

Static stretching refers to activities whereby a particular position (e.g. hip flexion with knee extension) is held for an extended period of time (e.g. 15-60s).

B.6.2.6 Dynamic Stretching

Dynamic stretching refers to activities whereby the end range of a particular motion is gradually increased by performing multiple repetitions without holding the stretch for an extended period of time. Two commonly used quasi-dynamic stretching strategies are proprioceptive neuromuscular facilitation (PNF) and active isolated stretching (AIS).

B.6.2. **4** – **7** _ Proprioceptive Neuromuscular Facilitation ~~Stretch~~ Stretching (PNF).

~~Alternation of muscle contraction and relaxation of both the agonist (muscle being stretched) and antagonist (muscle in opposition to the stretch) muscles, resulting in further relaxation of the muscle being stretched. This interaction results in a decrease in resistance and an increase in the range of motion. This type of stretching generally requires a partner and more time to learn. The partner must be experienced in PNF techniques in order to prevent injuries. Some studies indicate that PNF is superior to static stretching in improving range of motion.~~

~~**B.6.3** Flexibility Exercise Prescription~~

PNF techniques are said to enhance active and passive range of motion, and involve the contraction of opposing muscle groups (to actively move limbs through a range), and isometric contractions of the target muscle groups against resistance. This process is repeated numerous times, holding each contraction between 3-15s. The contraction of opposing muscle groups is thought to elicit “reciprocal inhibition”, which implies that when one muscle contracts, the muscles opposing motion (the muscle being stretched) will not.

B.6.2.8 Active Isolated Stretching (AIS)

Active Isolated stretching also relies on the performer to actively move their limbs to initiate motion, but does not involve a contraction of the target muscle, nor does it include a stretch of any duration. Performers are encouraged to hold for just 1-2 seconds and assistance to impose a greater stretch can be achieved by using a rope or partner.

B.6.3 _ Mobility and Flexibility Exercise Program .

B.6.3.1

~~Mode~~

Frequency .

~~The static stretching technique is safe and effective and is therefore the recommended method of improving flexibility. If personnel trained in the PNF method of training are available, stretching can be even more effective. To stretch the muscle statically and slowly, the muscle should be stretched to a point of tension, not pain, and held for at least 10 seconds. After the initial 10 seconds, the stretch should be lengthened a little further, and held another 10 seconds or longer. Each stretch should be repeated two to three times~~

Mobility and flexibility is something that can be emphasized daily. Whether integrated into a formal exercise program or an activity of daily living by using a large range of motion, firefighers should make every attempt to maintain their mobility and flexiblity. Although most commonly used before and after training as a part of a warm-up or cool down, mobility and flexibility exercise can also be integrated into any type of training session to enhance a particular objective .

B.6.3.2 Intensity.

Individuals should stretch to the point of tension, not pain. “No pain, no gain” definitely does not apply here. The stretch should be felt in the belly of the muscle and not at the joint. If resistance is felt in the joint (e.g. impingment in front of hip while doing a straight leg raise), mobility is likely being limited by a structural constraint and a mobilization activity will be needed.

B.6.3.3

~~Duration~~

T ime .

~~Each stretch should be held at least 10 seconds, then progressed to 30 seconds or longer. Completing a stretching program for the whole body will take approximately 10 to 15 minutes~~

In general, performance will not suffer unless a stretch is held beyond 60s. Whether performing a static or dyanmic stretch actively or passively, a minumum of 30 seconds is recommended to influence the compliance of the tissues being targeted .

B.6.3.4

~~Frequency.~~

~~Stretching can and should be done daily. After the initial warm-up, stretching exercises will prepare the body for the more strenuous workout to follow. Stretching after a workout improves flexibility and decreases muscle soreness. A minimum of three stretching workouts a week will generally improve flexibility~~

Type.

Provided that the reason for stretching is clearly defined, both static and dynamic stretching could be an appropriate means to elicit a particular response before, during or after a training session. However, in general dynamic stretching will be better suited than static stretching before and during the session because in addition to increasing range of motion, it will help elevate/maintain the performer’s physiological status (e.g. heart rate, blood flow, body temperature) and offer an opportunity to rehearse and engrain the relevant movement patterns. In contrast, static stretching, may be better suited than dynamic stretching post-training when the emphasis is recovery and regeneration, although the effectiveness of either method will largely depend on the preferences and abilities of the performer .

B.6.3.5 Progression.

~~To progress in the flexibility program, increases should be made in the duration of the stretch to more than 10 seconds, in the number of repetitions (up to five repetitions), or in the frequency of stretching. Flexibility can be maintained by stretching at least three times a week, especially before and after workouts. Conducting weight~~ Performers who have been identified as having passive mobility needs should seek to increase their available joint RoM via static or dynamic stretching, or joint mobilization activities. If physically unable to adopt specific body positions because they lack the passive mobility, they may not be able to take advantage of their experience, awareness, motivation, fitness, etc. Performers who have been identified as having active mobility needs should learn how to access the joint RoM that is currently available. Performers who have been identified as having sufficient active mobility should seek to integrate their accessible joint RoM into a variety of relevant activities. Having the awareness, motivation and physical ability to move within a range of contexts (e.g. patterns, environments) will improve the extent to which behaviors persist over time. Musculoskeletal fitness training activities using a full range of motion ~~in each exercise~~ will also help to maintain mobility and flexibility.

B.6.3.6 Stretching ~~Tips~~ Considerations .

The following tips can be helpful in making ~~stretching~~ mobility and flexibility exercise safe and effective:

(1) ~~Always warm up muscles with an activity that elevates heart rate and muscle temperature before stretching. Cold muscles should not be stretched~~

(2) Gradually increase the range of motion being accessed so that the target muscle temperature has an opportunity to be elevated.

(3) Changes may be acute (elastic) rather than permanent (plastic), which implies that changes made in one session may not persist .

(4) The breath should not be held while stretching. ~~Relaxing~~ Relaxed and slow breathing should be encouraged.

(5) All tissues should not be stretched. Know which tissues are limiting range of motion so that a targeted intervention can be created.

(6) Proper technique and posture/body alignment should be used when stretching. To elicit a performance benefit, stretching must influence the individual's motion patterns via a change in control or coordination such that they are better able to express a particular ability.

(7) Stretching a muscle should be discontinued if a dull ache or burning sensation that could indicate a tissue tear is experienced.

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B.7 ~~Healthy Back Exercise Program~~ _ Spine Health .

B.7.1 Significance.

Approximately ~~5 million~~ 80% of Americans will suffer from acute or chronic back pain ~~, which accounts for over 90 million lost production days annually. A report by M. Karter in the *NFPA Journal* found that lower back sprains and strains were the most common type of injury. The physical demands placed on firefighters put them at great risk~~ at some point in their lives, while one quarter will have had to deal with a painful episode in the last 3 months. Data also shows that low back injuries are the most common and costly musculoskeletal injury sustained by firefighters. The physical demands of firefighting elevate firefighters' risk of injury, especially if they are not adequately ~~conditioned~~ prepared .

~~The following are common~~ Common causes of lower back pain and injury ~~:~~

- ~~Weak abdominal and/or lower back muscles~~
- ~~Inflexible lower back, hamstrings, and hip flexor~~

~~Improper posture and body mechanics~~ include:

(1) Poor fitness. Without the physical fitness (e.g. strength, endurance, aerobic capacity) to lift relevant loads, hold specific postures for extended periods of time, or control spine motion while moving quickly, the demands on the low back will increase. High loads applied to the low back over a short time, or low loads applied over a long time can lead to acute and chronic injuries, respectively.

(2) Limited mobility. Individuals who do not have access (passive mobility) or cannot access (active mobility) sufficient range of motion in their ankles, hips and shoulders to perform all relevant tasks may be forced to comprise the position and control of their lower back.

(3) Poor body mechanics. The lumbar spine can handle high forces (i.e. applied tissue loads) with limited risk when in a neutral position, and large(r) ranges of motions with limited risk when the forces are low (e.g. walking). However, the combination of large ranges of motion and high forces is an established mechanism for injury (e.g. a neutral spine is a strong spine). For this reason, firefighters must develop the ability to maintain a neutral spine posture (i.e. control flexion, extension, lateral bend and twist) while squatting, lunging, hinging, pushing and pulling.

~~**B.7.8** – Using Weight Belts.~~

~~Recommendations for strength training involving the use of weight belts are as follows: For exercises not stressing~~

B.7.2

~~– Mode.~~

~~Strengthening and stretching exercises and exercises that improve aerobic fitness to lessen or prevent fatigue are general prescriptions in a healthy back exercise program. Specific exercises to strengthen the lower back, abdominal region, and the muscles in the trunk region are essential. The trunk region is often the weakest link in the body. It is responsible for transferring muscle forces from upper body to lower body, and vice versa, as well as for stabilizing and controlling movements of the spinal column. If lower back pain is consistent or severe, exercising should be discontinued, and the member should be examined by a physician.~~

~~**B.7.3** – Intensity.~~

~~All exercises should be carried out at a low to moderate intensity. Proper form, not high intensity, should be emphasized. Each exercise should be completed in a slow, controlled manner. All stretching should follow the prescription for static stretching.~~

~~**B.7.4** – Duration.~~

~~Exercise should continue for 10 to 20 minutes, depending on the number of exercises and stretches.~~

~~**B.7.5** – Frequency.~~

~~Healthy back exercises should be carried out three to five times a week. As mentioned previously, these exercises can be inserted into any warm-up routine.~~

~~**B.7.6** – Progression.~~

~~Stretches can be progressed by holding longer and gradually stretching further. Calisthenics and trunk strengthening exercises can be increased by completing more repetitions, or sets, or by adding light weights. The frequency of training can also be increased. Ten minutes of stretching and trunk strengthening exercises three times a week will maintain levels; 30 minutes a week to lessen the risk of a back injury is an excellent time investment. Cardiovascular and weight training exercises will also contribute to maintenance of a healthy back.~~

~~**B.7.7** – Improper Body Mechanics.~~

~~Improper posture or lifting mechanics are often the result of weak and inflexible muscles. Strengthening the trunk region and improving flexibility will improve body mechanics.~~

~~Virtually all lifting tasks involve the legs; therefore, the legs should be strengthened. However, it is crucial for a firefighter to employ proper lifting techniques even when the load is relatively light. Lifting free weights can help in learning how to lift properly, but specific lifting procedures should be followed for various fireground tasks. The feet should be approximately shoulder width apart, legs bent at the hips and knees, lower back flat or slightly bowed inward, chest and buttocks out, head erect. The power to lift should come from the legs and lower trunk, not the upper body.~~

Healthy Back Program

Viewed as a means to engrain and enhance control and coordination of spine motion for the purpose of preventing low back injuries and improving performance, a healthy back program should be designed to reflect the performer's physical demands. For example, if the performer is frequently tasked with lifting heavy loads (i.e. high intensity) or working for extended periods of time (i.e. long duration), the frequency, intensity, and time of their health back program should reflect this. If the demands of the healthy back program to not progress to reflect those that are relevant to the performer, they will lack the mobility and fitness to adopt the postures and movement patterns (i.e. body mechanics) required to maintain low back health.

B.7.2.1 _ Frequency.

With few exceptions, every exercise will challenge the “core“ (e.g. squats challenge performers’ ability to resist spine flexion, a one-arm overhead press challenges performer’ control of lateral bend), and thus every exercise session will likely require that the performer make a concerted effort to maintain a neutral spine curvature. Further, when choosing an appropriate number of repetitions or sets, consideration should be given to the secondary training objectives (e.g. speed, strength, endurance) such that a relevant “core” (i.e. trunk) challenge can be imposed.

B.7.2.2 _ Intensity.

As mentioned, above, the low back will play a critical role in all squatting, lunging, hinging, pushing and pulling movements, the intensities chosen to challenge the trunk should reflect the relevant demands of training. This may imply that high intensity (load or speed) short duration activities or low intensity long duration activities need to be included. However, it will be important to use an intensity that is apropriate for the performer's current ability. Their movement patterns can then be used to establish their readiness to progress.

B.7.2.3 Time .

The work and rest periods used in a healthy back program should also reflect the demands (and needs) of the performer; however, consideration should be given to the length of time that specific spine motions are targeted. For example, having to resist spine flexion while squatting will impose a different challenge than having to resist spine extension while performing a push-up. Short, moderate and long duration activities (with corresponding rest periods) would each be approrpriate for a healthy back program if relevant tot he performer's demands.

B.7.2.4 Type.

As above, viewed as a means to engrain and enhance control and coordination of spine motion, “core” training should not be constrained to dynamic spine motion and static activities. The key to choosing suitable exercises will be recognizing the trunk’s role so an emphasis can be placed on the appropriate key features (i.e. spine flexion, extension, lateral bend or twist). For example, a front plank and push-up impose a similar trunk challenge (i.e. resist spine extension), albeit with varying degrees of limb movement. Similarly, a side plank and one-arm overhead press will both challenge a performer to resist lateral bend.

B.7.3 Progression.

In general, the frequency, intensity and time of a healthy back program should be progressed using the same principles described for cardiorespiratory and musculoskeletal fitness. However, because it will be more challenging to control spine motion in the frontal plane (i.e. lateral bend) than in the sagittal plane (i.e. flexion and extension), and even more challenging in the transverse plane (i.e. twist), exercises should be progressed by plane of motion (flexion/extension - lateral bend - twist). Firefighters should arguably be able to exhibit control of flexion and extension before being challenged with lateral bend or twist.

As an exercise becomes more dynamic it will also become more challenging to control and coordinate the spine motions of interest. For this reason, the program can also be progressed by the extent to which upper and lower extremity motion is involved in the exercises (i.e. static - upper limbs - lower limbs). For example, it will be more challenging to control spine motion in a push-up than a front plank because the arms are moving, but even more challenging still to control spine motion if the push-up or plank including hip flexion, as in a mountain climber or burpee.

B.7.4 _ Considerations for the Design of a Healthy Back Program

(1) *Resisting spine motion is important.* All spine motion does not impose risk; however, flexion, extension lateral bending and twisting under load will increase the possibility and/or progression of a disc herniation or vertebral fracture. Because the forces applied to the spine's tissues comprise loads from the external environment (e.g. holding a weight in your hands) and the internal environment (e.g. contracting muscles), exercises that require dynamic spine motion with high levels of muscle activity (e.g. weighted crunch) could impose as much risk as performing a deadlift with a flexed spine.

(2) *Unstable training may not improve spine health.T* raining on an unstable surface may provide an appropriate training stimulus to improve whole-body balance; however, it is not necessarily an appropriate strategy to improve control of spine motion. Faced with the choice of sacrificing a neutral spine posture or losing balance, performers will be forced to adopt a movement strategy that allows them to remain upright. When placing an unstable load in the hands (e.g. cable) or on the back (e.g. barbell with bands), or pushing/pulling against an unstable surface (e.g. suspended handles), the control and coordination required to perform the activity will be elevated in comparison to a stable variation of the same pattern with an equivalent load. Because additional effort will be needed, the frequency, intensity and time of the exercise may need to be adjusted so that the demands of the activity do not exceed the performer's capacity. Using an unstable load can be an excellent way to improve a client's control and coordination.

(3) *Static and dynamic activities can provide benefit* . Although links have been made between the incidence of low back problems and trunk extensor endurance times, trunk extensor endurance is not a mechanism of low back injury. Superior endurance provides the opportunity to maintain spine-sparing postures for extended periods of time by delaying the onset of fatigue. But, if individuals do not adopt these postures for any number of reasons, muscular endurance becomes secondary and will have little bearing on the risk of injury. From an injury perspective, there is also evidence to suggest that trunk extensor strength and endurance, or symmetry between the front, back and sides may be more important than flexor endurance, which is commonly achieved via exercises such as the static front plank. However, limiting the progression of a "spine health" exercise to extended durations is unlikely to provide the most favorable long-term adaptations given that many of the sport-, occupation- and life-related activities relevant to firefighters are highly dynamic and comprise a range of frequencies, intensities and times.

(4) *Use the hips to rotate* . To emphasize rotation while exercising does not imply that the act of rotating or twisting be included, particularly when seeking to improve a individual's control, coordination and general body awareness. Developing the capacity to resist rotation should be viewed as a pre-requisite for the inclusion of more dynamic movements that involve actual rotation. In situations where rotation is the priority, motion should come largely from the hips since they are better suited to generate power (i.e. high forces and large ranges of motion in short durations) in comparison to the spine.

B.7.5 _ Using Weight Belts.

Considerations for weight belt use are as follows:

(1) For exercises that do not impose a demand on the back, a belt should not be worn.

(2) For exercises ~~directly stressing the back~~ that do impose a demand on the back (risk placing the back in a compromised position) , a belt should ~~not~~ only be worn during ~~lighter sets but always worn for~~ near maximal and maximal ~~sets~~ efforts .

(3) ~~It should never be assumed that a~~ A weight belt will not afford protection against improper ~~lifting~~ body mechanics and exercise technique.

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B.8 Safety and Injury Prevention.

The following are general guidelines for the prevention of injuries while exercising:

(1) ~~Warm-up and stretching exercises should be performed before a workout. The exercise intensity and stretch should be gradually tapered after a workout.~~

(2) ~~Members should not overestimate their abilities when beginning an exercise program. Starting out slow and easy and gradually increasing the exercise intensity, duration, or frequency is paramount. Members need to remember that they do not get out of shape overnight and that they cannot get into shape overnight. They need to be patient.~~

(3) When possible, include a warm-up activity. The intensity should be increased gradually to match the demands of the exercise session.

(4) Scale the frequency, intensity, and time of the exercise session and the complexity of the exercises to suit each individual's needs. Place an emphasis on long-term sustainable improvements.

(5) Place an emphasis on using proper body mechanics, including the 7 key movement features while performing any type of exercise. Injuries are influenced by load, repetition and posture.

(6) Work within the joint ranges of motion that can be accessed without compromising stability at an adjacent joint.

(7) Integrate passive and active recovery activities within and between exercise sessions. Chronic muscle soreness and fatigue are signs of overtraining. ~~They indicate the need to reduce the workout stimulus, to increase the recovery period between workouts, or both. The body's messages should be heeded.~~

(8) ~~Properly fitting exercise equipment and clothing should always be worn.~~

~~Performing the same workout routine should be avoided. Variety not only reduces boredom but also avoids overuse-type injuries. Periodically changing the modes of exercise, the intensity, and the duration of workouts is required. Changing the exercise stimulus also issues a new challenge to the body, resulting in continued improvements.~~

(9)

(10) Maintain equipment and ensure the exercise space/facilities are cleaned regularly.

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C.1 General.

A self-assessment gives the member valuable feedback on their individual fitness level, ability to recover from exertion, and overall physical capacity~~ as it pertains to the job~~ . It is an evaluation that the member can safely perform in private to ~~provide individualized feedback on personal level of~~ gain insight regarding their current fitness, ~~level of~~ recent improvement, and ~~physical capacity for exercise. The exercises, weights, repetitions, and aerobic equipment chosen for use in a self-assessment should be similar to the actual job.A~~ areas to pursue further change.

The self-assessment described below can be performed ~~at the workout location~~ with minimal equipment. ~~An assessment should~~ It can be customized for ~~the member to measure accurately his or her individual ability to perform actual, essential job tasks specific to the routine duties of the department~~ and by each member to ensure that it accomodates their current abilities . The information collected from the assessment is valuable ~~to uniformed personnel~~ because it can be ~~compared~~ used to ~~previous and future assessments. If an individual's heart rate at 1 minute exceeds 90 percent of the estimated maximum, that individual could lack the reserve necessary to perform safely on the fireground. Similarly, if an individual is unable to complete the repetitions of a particular exercise, that individual could be unable to sufficiently complete the essential task that the exercise simulates. This information should be used to motivate the member to improve any deficiencies noted during the evaluation~~ track progress and identify specific areas that could be targeted with an exercise program. The results may also shed light on specific aspects of the member's capacity that will influence their safety on the fireground (e.g. ability to recover) .

A personalized exercise ~~prescription~~ program is a major component of the wellness program. ~~The personalized exercise prescription should be a progressive plan that accounts for an individual's~~ It should accomodate the member's current level of fitness as determined via information from the ~~self-assessment,~~ periodic assessments completed throughout the year, in addition to relevant job duties, ~~time restrictions~~ barriers to activity , physical capabilities, ~~nutritional~~ dietary status, ~~and self-improvement~~ sleep habits, motivation and mindset .

Statement of Problem and Substantiation for Public Comment

Updated to reflect other changes in document and suggested changes to self assessment form.

Related Item

• FR-29

Submitter Information Verification

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Submittal Date: Mon Oct 28 09:30:19 EDT 2019
Committee: FIX-AAA

Public Comment No. 20-NFPA 1583-2019 [Section No. C.2]

C.2 Example ~~of Circuit~~ Self-Assessment ~~Test~~ .

~~One type of~~ The example self-assessment ~~is a circuit test. A member who is going to perform a circuit self-assessment test should be medically cleared to participate in the assessment. The member should warm up properly prior to beginning the assessment,~~ described below is just one of many option that can be used to track progress and identify areas for further improvement. It is structured in two parts (i.e. mobility and flexiblity followed by strength and endurance), and provides to accomodate the interests, abilities and needs of each member. Note that prior to participating in the self-assessment, every member should be medically cleared by the department physician. Additionally, the member should complete a brief warm-up properly and then follow the protocol below.

Prior to performing the self-assessment, assemble the following equipment:

(1) Heart rate monitor

(2) ~~Dumbbells [pairs of 15 lb, 20 lb, 30 lb, and 35 lb (7 kg, 9 kg, 14 kg, and 16 kg)]~~

(3) Wooden dowel

(4) Measuring Tape

(5) Rope OR Resistance Band

(6) Treadmill (capable of 9. 5 mph and 15 percent grade)

(7) ~~Lat pulldown machine [set at 80 lb (36 kg)]~~

(8) ~~Flat bench~~

(9) OR Stepmill (capable of 118 steps per minute)

(10) Wall OR equivalent object to lean against (minimum 8 feet in height)

(11) Bar to hang from (adjustable from 3-8 feet off the floor)

(12) Dumbbells (if applicable; choice load)

Place the equipment conveniently close to the treadmill (or Stepmill) as you will be returning to this piece of equipment throughout the assessment.

Wet the heart receiver and put it on your chest. Tighten it to a comfortable setting. Turn on the watch and be sure it is receiving your heart rate.

Now you are ready to begin the assessment. ~~Remember that~~ Note that for the second part of the assessment you will be recording both your time and your heart rate. Therefore you should move at as brisk a pace as you feel comfortable between ~~events~~ exercises .

Get your self-assessment worksheet *(see Figure C.2)* ~~and~~ , mark the date, and check each of the boxes that you will include in the assessment . Keep this sheet with you as you proceed so you can ~~record your heart rate immediately after each event~~ note the specific assessment criteria that are met (part 1) and document your heart rate, rating of perceived exertion (RPE) and load (part 2) . Once the ~~test~~ assessment has begun, an attempt should be made to move from one ~~station~~ exercise to the next with no more than 30 seconds between ~~events. Movements with weights should be through the full range of motion, and both the concentric and eccentric contractions.The steps~~ each. For each of the squat, lunge, hinge, push and pull exercises performed in part 2, an effort should be made to use a consistent range of motion throughout the activity so furture comparisons can be made.

The components of the self-assessment are as follows:

Part 1 - Mobility and flexiblity (choose 1 or both of the activities listed for each joint)

(1) Without shoes on, stand with your feet about hip width apart and flat on the floor. Hold the wooden dowel in both hands, approximately shoulder width apart using an overhand grip. Place the dowel at shoulder height, and in one slow and controlled motion, press the dowel overhead. Repeat 3 times. To 'pass' this activity (i.e. meet the mobility criteria) the dowel must be positioned directly overhead (i.e. upper arm aligned with torso) when the arms are fully extended, while the shoulders remain down and away from the ears. These critieria only need to be met on one of the three repetitions.

(2) Without shoes on, stand with your feet about hip width apart and flat on the floor. Hold the wooden dowel in both hands, approximately shoulder width apart using an overhand grip. In one slow and controlled motion, lower the dowel towards the ground while attempting to keep your back straight. Stand back up. Repeat 3 times. To 'pass' this activity (i.e. meet the mobility criteria) the dowel must be reach mid-shin height, while the back remains in a neutral position (i.e. same curvature as when standing). You may bend your knees as much as necessary. These critieria only need to be met on one of the three repetitions.

(3) Without shoes on, stand in a staggered stance with your feet about hip width apart (right foot forwards). Hold the wooden dowel in your right hand and place it vertically on the floor (as if using for balance) aligned with the tip of your longest toe. In one slow and controlled motion, lower your back knee towards the floor without raising the front heel. Descend to a front knee angle of approximately 90 degrees without resting the back knee on the floor. Repeat 3 times. To 'pass' this activity (i.e. meet the mobility criteria) the bony prominance on the lateral side of your knee must pass the dowel, while the heel stays on the floor and your knee, hip and foot remain aligned if viewing from the front. Repeat with the left leg. These critieria only need to be met on one of the three repetitions, but must be met on the left and right side.

(4) While standing, make a fist (thumb inside) with your right hand. In one slow and controlled motion, raise your arm overhead. From this overhead position, reach down behind your head with the closed fist. Once at end range, press lightly on your elbow with the left hand to see if you can achive any further range. Repeat 3 times. To 'pass' this activity (i.e. meet the mobility criteria) any part of the first must pass the 7th cerival vertebrae. This can be found be bending your head forwards and feeling for the boniest part of your neck. Repeat with the left arm. This critieria only needs to be met on one of the three repetitions, but must be met on the left and right side.

(5) Lie flat on the ground with a natural curve in your lower back and your legs straight. Wrap one end of the rope (or resistance band) around your right foot. Hold the other end of the rope (or band) in your hands. In one slow and controlled motion, raise your right leg off the floor. Once at end range, pull lighlty on the rope (or band) to see if you can achieve any further range without the left leg being raised or losing the natural curve of your back. To 'pass' this activity (i.e. meet the mobility criteria) the right ankle must travel past mid-thigh on your left leg. Repeat with the left leg. This critieria only needs to be met on one of the three repetitions, but must be met on the left and right side.

(6) Without shoes on, stand in a staggered stance with your right toes touching the wall and right heel flat on the floor. Place your hands on the wall. In one slow and controlled motion, lean forwards and attempt to touch your right knee to the wall. If successful, move your right foot back slightly (off the wall) and repeat. Continue moving the foot backwards until the knee can no longer touch. Note the distance between the wall and your toes when you could last touch your knee to the wall. To 'pass' this activity (i.e. meet the mobility criteria) the right toes must be at least 4 inches away from the wall, while the heel stays on the floor and your knee, hip and foot remain aligned if viewing from the front. Repeat with the left leg. This critieria only needs to be met on one of the three repetitions, but must be met on the left and right side.

Part 2 - Strength and Endurance (choose 1 cardiorespiratory activity and 1 squat, push, lunge, pull and hinge pattern exercise)

Cardiorespiratory Options

(1) Treadmill at 9.5 mph and 5% grade. Straddle the treadmill and start the belt. ~~Be sure to set the exercise time for 20 minutes so it can run continually during your evaluation. Set the speed for 3.5 mph~~ Set the speed at 2 mph while you increase the incline to 5%. As soon as the belt reaches 2 mph you can step on the treadmill. Once the incline reaches 5%, increase the speed to 9.5 mph. As soon as the speed hits 9.5 mph the assessment will begin. Run on the treadmill at 9.5 mph and 5% grade for 1 minute. At the end of the minute record your heart rate and rating of perceived extertion (RPE) on a scale of 1-10 (10 being the most challenging thing you have ever done) and transition to the next exercise in the circuit.

(2) Treadmill at 6.5 mph and 10% grade. Straddle the treadmill and start the belt. Set the speed at 2 mph while you increase the incline to ~~15 percent~~ 10% . As soon as the belt reaches ~~2 mph~~ 2 mph you can step on the treadmill. Once the incline reaches ~~15 percent~~ 10% , increase the speed to 6. 5 mph . ~~0 mph.~~ As soon as the speed hits ~~5.0 mph begin timing your assessment. 6.5 mph the assessment will begin.~~ ~~Run on the treadmill at 6.~~ 5

~~.0 mph on a 15 percent grade for 1 minute. At the end of 1 minute, reduce the speed to 3.5 mph and step off the treadmill. Record your heart rate and move to the 15 lb dumbbells.~~

(3) ~~Pick up the 15 lb dumbbells and perform 24 biceps curls with both arms simultaneously. Do not swing your arms or upper body. Be sure to move through the full range of motion. After the 24th repetition, record your heart rate and move back to the treadmill.~~

(4) ~~Walk on the treadmill for 1 minute at 3.5 mph on a 15 percent grade. After 1 minute, record your heart rate and move on to the dumbbell (DB) row.~~

(5) ~~Place your left knee and left arm on the flat bench and pick up the 30 lb dumbbell with your right hand. Keeping your chest parallel to the ground, pull the dumbbell upward and into your lower chest. Perform 24 repetitions with your right arm. Then place your right knee and right arm on the bench and perform 24 repetitions with your left arm. Record your heart rate and move on to the treadmill.~~

(6) ~~Walk on the treadmill for 1 minute at 3.5 mph on a 15 percent grade. After 1 minute, record your heart rate and move on to the DB military press.~~

(7) ~~Pick up the 20 lb dumbbells and in a standing position perform 24 repetitions (with each arm) of alternating military press. Record your heart rate and move on to the treadmill.~~

(8) ~~Walk on the treadmill for 1 minute at 3.5 mph on a 15 percent grade. After 1 minute, record your heart rate and move on to the DB carry.~~

(9) ~~Bend down using your legs and pick up both 35 lb dumbbells (one in each hand). Carry the dumbbells to a mark 6 ft away and set them down on the ground. Turn, pick up the dumbbells, and return to where you started. Complete 10 repetitions, with each time you set down the dumbbells counting as one repetition. Record your heart rate and return to the treadmill.~~

(10) ~~Walk on the treadmill for 1 minute at 3.5 mph on a 15 percent grade. After 1 minute, record your heart rate and move on to the lat pulldown.~~

~~Sit down with knees secured and grasp the straight lat pulldown bar with your hands close together and your palms facing you. Pull down in front of your body until the bar reaches your chin. Perform 24 repetitions, being sure to go all the way up. Record your total time and heart rate~~

(11) mph and 10% grade for 1 minute. At the end of the minute record your heart rate and RPE on a scale of 1-10 and transition to the next exercise in the circuit.

(12) Treadmill at 3.5 mph and 15% grade. Straddle the treadmill and start the belt. Set the speed at 2 mph while you increase the incline to 15%. As soon as the belt reaches 2 mph you can step on the treadmill. Once the incline reaches 15%, increase the speed to 3.5 mph. As soon as the speed hits 3.5 mph the assessment will begin. Walk on the treadmill at 3.5 mph and 15% grade for 1 minute. At the end of the minute record your heart rate and RPE on a scale of 1-10 and transition to the next exercise in the circuit.

(13) Stepmill at level 14 (118 steps per minute). Step on the stepmill . Set the speed at level 4 (46 steps per minute) for 20s. After 20s, increase the speed to level 14 (118 steps per minute). As soon as the speed hits level 14, the assessment will begin. Climb stairs on the stepmill at level 14 for 1 minute. At the end of the minute record your heart rate and RPE on a scale of 1-10 and transition to the next exercise in the circuit.

(14) Stepmill at level 10 (89 steps per minute) with a 20lb weighted vest. Secure the weighted vest and step on the stepmill . Set the speed at level 4 (46 steps per minute) for 20s. After 20s, increase the speed to level 10 (89 steps per minute). As soon as the speed hits level 10, the assessment will begin. At the end of the minute record your heart rate and RPE on a scale of 1-10 and transition to the next exercise in the circuit.

(15) Stepmill at level 6 (60 steps per minute) with a 40lb weighted vest. Secure the weighted vest and step on the stepmill . Set the speed at level 4 (46 steps per minute) for 20s. After 20s, increase the speed to level 6 (60 steps per minute) mph. As soon as the speed hits level 6, the assessment will begin. Climb stairs on the stepmill at level 6 for 1 minute. At the end of the minute record your heart rate and transition to the next exercise in the circuit. At the end of the minute record your heart rate and RPE on a scale of 1-10 and transition to the next exercise in the circuit.

Musculoskeletal Options

(1) One leg squat. Stand on one leg and place your arms to the front or side. While keeping your stance heel in contact with the floor squat down as low as you are comfortable with, and stand back up. Perform 30 repetitions with a load of your choice (15 each leg). An effort

should be made to keep the stance knee, hip and foot aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(2) Jump squat. Stand with feet approximately hip width apart and your arms to the front or side. Jump and land. Perform 30 repetitions with a load of your choice. An effort should be made to keep the knees, hips and feet aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(3) Air squat. Stand with feet approximately hip width apart and your arms to the front or side. Squat down as low as you are comfortable with, and stand back up. Perform 30 repetitions with a load of your choice. An effort should be made to keep the knees, hips and feet aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(4) Handstand push-up. Adopt an inverted position, facing away from the wall with your hands approximately 1-1.5 feet from the wall. Lower yourself towards the floor as far as you are comfortable, and return to an outstretched arm position. Perform 30 repetitions with a load of your choice. An effort should be made to keep the shoulders down away from the ears and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(5) Push-up. Adopt a push-up position, with the hands and feet shoulder width apart. Lower yourself towards the floor as far as you are comfortable with, and return to an outstretched arm position. Perform 30 repetitions with a load of your choice (change body angle or use band resistance/assistance as needed). An effort should be made to keep the shoulders down away from the ears and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(6) Front plank with shoulder tap. Adopt a push-up position, with the hands shoulder width apart and the feet a minumum of shoulder width apart. Lift your right hand and touch the left shoulder. Repeat on the left side. Perform 30 repetitions with a load of your choice (15 each arm). An effort should be made to keep the shoulders down away from the ears and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(7) Lateral lunge. Stand with feet approximately hip width apart and your arms to the front or side. Lunge to the right, descend as low as you are comfortable with, and return to standing. Repeat on the left side. Perform 30 repetitions with a load of your choice (15 each leg). An effort should be made to keep the knees, hips and feet aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(8) Front lunge. Stand with feet approximately hip width apart and your arms to the front or side. Lunge forwards with the right leg, descend as low as you are comfortable with, and return to standing. Repeat on the left side. Perform 30 repetitions with a load of your choice (15 each leg). An effort should be made to keep the knees, hips and feet aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(9) Back lunge. Stand with feet approximately hip width apart and your arms to the front or side. Lunge backwards with the right leg, descend as low as you are comfortable with and return to standing. Repeat on the left side. Perform 30 repetitions with a load of your choice (15 each leg). An effort should be made to keep the knees, hips and feet aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(10) Pull-up. Adopt a hang position, with a prone or neutral grip. Raise your chin towards the bar and return to an outstretched arm position. Perform 30 repetitions with a load of your choice (band assistance can be used). An effort should be made to keep the shoulders down away from the ears and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(11) Inverted row. Adopt a inverted hang position beneath the bar, with the hands and feet shoulder width apart and the hips extended. Adjust the height of the bar to suit your abilities and bent the knees to aproxiamtely 90 degrees. Pull yourself towards the bar, and return to an outstretched arm position. Perform 30 repetitions with a load of your choice (change body angle or use band resistance/assistance as

needed). An effort should be made to keep the shoulders down away from the ears and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(12) Inverted hang with shoulder tap. Adopt an inverted hang position, with the hands shoulder width apart and the feet a minumum of shoulder width apart. The hips should be extended with the knees at 90 degrees. Lift your right hand and touch the left shoulder. Repeat on the left side. Perform 30 repetitions with a load of your choice (15 each arm). An effort should be made to keep the shoulders down away from the ears and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(13) One leg Romanian deadlift (RDL). Stand on one leg and place your arms to the front or side. While keeping your stance heel in contact with the floor and a slight bend in your stance knee, bend at forward at the hips, go down as low as you are comfortable with, and stand back up. Perform 30 repetitions with a load of your choice (15 each leg). An effort should be made to keep the stance knee, hip and foot aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(14) Good morning. Stand with the feet hip width apart and the arms across your chest or behind your head. While keeping your feet in contact with the floor and a slight bend in your knees, bend at forward at the hips, go down as low as you are comfortable with, and stand back up. Perform 30 repetitions with a load of your choice. An effort should be made to keep the knees, hips and feet aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

(15) Alternating hips bridge. Lay on your back on the floor with your knees bent to 90 degres and your arms at the side. Raise your hips off the floor to assume a straight body position. While keeping your feet in contact with the floor and the hips raised, lift the right foot off the floor, flex your right hip as far as you are comfortable with, and lower it back down to the floor. Repeat on the left side. Perform 30 repetitions with a load of your choice (15 each leg). An effort should be made to keep the stance knee, hip and foot aligned if viewed from the front and the back in a neutral position (same as standing). At the end of the 30 repetitions, record your heart rate, RPE and the load used and transition to the next exercise in the circuit.

Circuit Protocol

(1) Perform the cardiorespiratory activity for 1 minute. Record your heart rate and RPE and transition to the next exercise in the circuit.

(2) Perform 30 repetitions of the squat pattern activity. Record your heart rate and RPE and the load used transition to the next exercise in the circuit.

(3) Perform the cardiorespiratory activity for 1 minute. Record your heart rate and RPE and transition to the next exercise in the circuit.

(4) Perform 30 repetitions of the push pattern activity. Record your heart rate and RPE and the load used transition to the next exercise in the circuit.

(5) Perform the cardiorespiratory activity for 1 minute. Record your heart rate and RPE and transition to the next exercise in the circuit.

(6) Perform 30 repetitions of the lunge pattern activity. Record your heart rate and RPE and the load used transition to the next exercise in the circuit.

(7) Perform the cardiorespiratory activity for 1 minute. Record your heart rate and RPE and transition to the next exercise in the circuit.

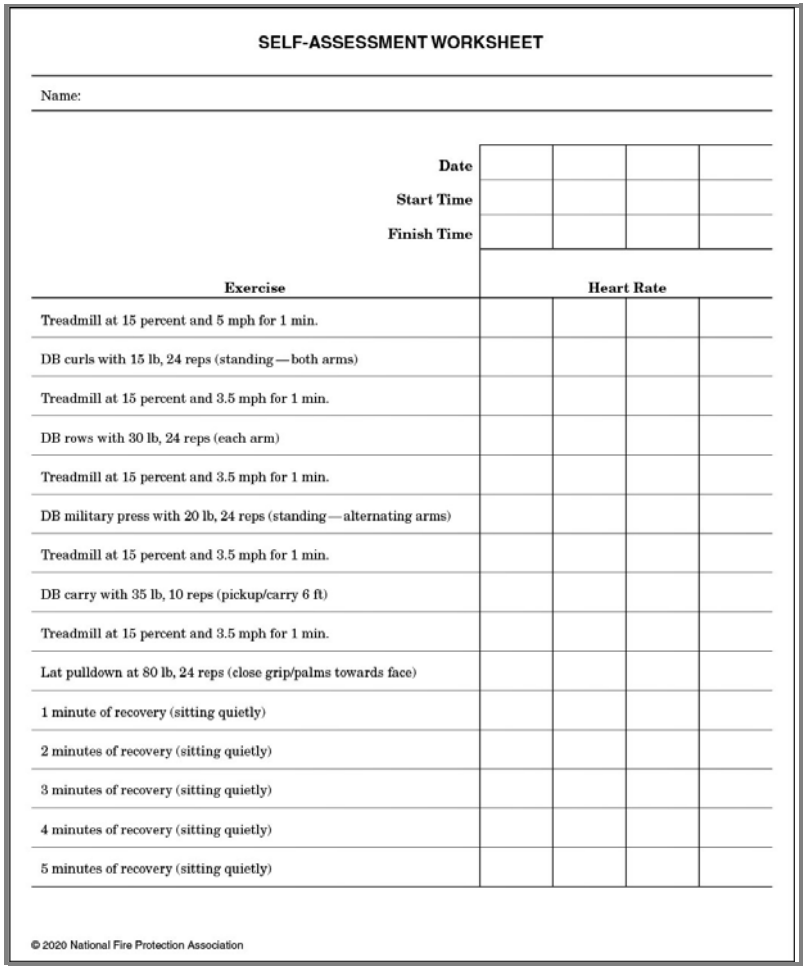
(8) Perform 30 repetitions of the pull pattern activity. Record your heart rate and RPE and the load used transition to the next exercise in the circuit.

(9) Perform the cardiorespiratory activity for 1 minute. Record your heart rate and RPE and transition to the next exercise in the circuit.

(10) Perform 30 repetitions of the hinge pattern activity. Record your heart rate and RPE and the load used transition to the next exercise in the circuit .

(11) Sit in a quiet location and record your heart rate and RPE every minute for ~~5 minutes~~ 3 minutes .

Figure C.2 Self-Assessment Worksheet.



SELF-ASSESSMENT WORKSHEET

Name:

Date				
Start Time				
Finish Time				

Exercise	Heart Rate			
Treadmill at 15 percent and 5 mph for 1 min.				
DB curls with 15 lb, 24 reps (standing—both arms)				
Treadmill at 15 percent and 3.5 mph for 1 min.				
DB rows with 30 lb, 24 reps (each arm)				
Treadmill at 15 percent and 3.5 mph for 1 min.				
DB military press with 20 lb, 24 reps (standing—alternating arms)				
Treadmill at 15 percent and 3.5 mph for 1 min.				
DB carry with 35 lb, 10 reps (pickup/carry 6 ft)				
Treadmill at 15 percent and 3.5 mph for 1 min.				
Lat pulldown at 80 lb, 24 reps (close grip/palms towards face)				
1 minute of recovery (sitting quietly)				
2 minutes of recovery (sitting quietly)				
3 minutes of recovery (sitting quietly)				
4 minutes of recovery (sitting quietly)				
5 minutes of recovery (sitting quietly)				

Additional Proposed Changes

File Name	Description	Approved
C.1_Self_Assessment_Tool.pdf	Self Assessment Example (pdf)	
C.1_Self_Assessment_Tool.docx	Self Assessment Example (word)	

Statement of Problem and Substantiation for Public Comment

Updated to reflect the literature, the WFI, the PFT program and other recommendations made throughout the document.

Related Item

• FR-29

Submitter Information Verification

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Committee: FIX-AAA

Public Comment No. 21-NFPA 1583-2019 [Section No. C.3]

C.3 Interpreting Your Results.

Interpret your results as follows:
Mobility and Flexibility

(1) If you met the 'passing' criteria on the shoulder reach, you have adequate *passive* shoulder flexion mobility. If you also met the 'passing' criteria on the overhead press, you can also be described as having *active* shoulder flexion mobility. If you met the criteria for both exercises, you should continue to use your available range of moton in relevant activities. If you met the criteria for the shoulder reach but not the overhead press, an effort should be made to learn how to use the range of motion you currently have. If you did not meet the criteria for the shoulder reach, an effort should be made to increase your passive shoulder flexion range of motion.

(2) If you met the 'passing' criteria on the straight leg raise, you have adequate *passive* hip flexion mobility. If you also met the 'passing' criteria on the hip hinge you can also be described as having *active* hip flexion mobility. If you met the criteria for both exercises, you should continue to use your available range of moton in relevant activities. If you met the criteria for the straight leg raise but not the hip hinge, an effort should be made to learn how to use the range of motion you currently have. If you did not meet the criteria for the straight leg raise, an effort should be made to increase your passive hip flexion range of motion.

(3) If you met the 'passing' criteria on the weight bearing lunge, you have adequate *passive* ankle dorsiflexion mobility. If you also met the 'passing' criteria on the split squat, you can also be described as having *active* ankle dorsiflexion mobility. If you met the criteria for both exercises, you should continue to use your available range of moton in relevant activities. If you met the criteria for the weight bearing lunge but not the split squat, an effort should be made to learn how to use the range of motion you currently have. If you did not meet the criteria for the weight bearing lunge, an effort should be made to increase your passive ankle dorsiflexion range of motion.

Strength and Endurance Circuit

(1) Determine 85 percent of your estimated maximum heart rate, which will be the target exercise heart rate, using the following simple Karvonen Method equation:

Target exercise heart rate = 0.85 (220 – age)

Example: The target exercise heart rate of a 40-year-old individual would be 153. [*Target exercise heart rate = 0.85 (220 – 40) = 153*]

(2) Observe your heart rate throughout the ~~test~~ assessment to see if it ever goes ~~over~~ above your 85 percent value. If your heart rate is near maximal, it could indicate that you need to work on your ~~cardiovascular conditioning~~ cardiorespiratory fitness . This ~~indicates~~ may indicate that you ~~could~~ have ~~very little~~ limited reserve if ~~some greater demand occurs~~ tasked with a similar demand on the fireground.

(3) For each ~~event~~ exercise , ~~evaluate~~ note whether you completed ~~the required number of~~ 30 repetitions while meeting the movement-related criteria. repetitions. If you were able to perform 30 repetitions while maintaining the movement criteria, you would be described as having the physical capacity to meet the demand of the activity, and could ~~not complete the required number of repetitions, you need to work on your muscular strength and/or endurance in these muscle groups~~ increase the challenge. If you were able to perform 30 repetitions but did not maintain the movement criteria, you have sufficient fitness to meet the demands of the activity, but should improve your awareness and body mechanics. If you were unable to perform the 30 repetitions, you would be described as lacking the fitness to meet the demands of the activity, and should prioritize fitness .

(4) Observe your total time and compare it to your ~~last~~ total time ~~. If your total time for this test is less than your last test~~ from the previous self-

assessment. If you were able to complete the circuit in less time than your last self-assessment, and your heart rate ~~response is~~ and/or RPE was the same or ~~less~~ lower , your general fitness level has improved.

(5) Observe your ~~5~~ 3 -minute recovery. A heart rate that recovers quickly is indicative of ~~aerobic~~ cardiorespiratory fitness. If your ~~5-minute~~ heart rate ~~is less than your last test, your~~ after 1, 2 and 3 minutes was lower than than your last self-assessment, your cardiorespiratory fitness level has improved.

Statement of Problem and Substantiation for Public Comment

Recommended changes to reflect others made throughout the document.

Related Item

• FR-29

Submitter Information Verification

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Committee: FIX-AAA

Public Comment No. 5-NFPA 1582-2019 [Global Input]

The proposed standards create different medical criteria for candidates versus members. I fear that this will put departments who follow this recommendation in a difficult, if not impossible, position when defending adverse employment actions that are challenged under the ADAAA or ADEA (and possibly other equal employment protections). I would recommend consulting with an attorney who specializes in these fields before going forward with any such distinctions.

Statement of Problem and Substantiation for Public Comment

Legal issues.

Related Item

• 1582

Submitter Information Verification

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Committee:

Public Comment No. 6-NFPA 1582-2019 [Global Input]

Recommend to seek legal advice to find out whether having different standards for applicants and incumbents is an ADA violation.

Statement of Problem and Substantiation for Public Comment

Avoiding ADA violation

Related Item

• Public Input No. 13-NFPA 1582-2018 [Global Input]

Submitter Information Verification

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Submittal Date: Tue Nov 26 00:04:59 EST 2019
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Public Comment No. 7-NFPA 1582-2019 [Global Input]

The intent of this submission is to delete the current Chapter 6 (for applicants) and Chapter 9 (for current employees) and replace them with a new Chapter that will merge the prior content of both current Chapters.

I believe that there is no scientific basis for having separate medical criteria for applicants other than that which apply to current employees. Therefore, I request that the medical criteria for applicants (in Chapter 6) and those which apply for current employees (in Chapter 9) be combined into a single chapter that applies to both applicants and current employees without distinction between these two groups of individuals.

I believe this current separation is a violation of the Americans with Disabilities Act (ADA) and the rulings of the Equal Employment Opportunity Commission (EEOC). This implicit violation of federal law exposes any employer who follows NFPA 1582 to legal consequences.

On a medical basis, if a medical condition is compatible with a current employee performing the "essential job functions" of a position, there is no justification for denying another individual - such as an applicant - the opportunity to determine if that individual can also perform the essential job tasks with the same medical condition. However, the currently in effect version of NFPA 1582, and proposed update to NFPA 1582, would deny an applicant from even being considered for employment solely due to being an applicant rather than having the status of being a current employee.

I believe the most significant issue is that there are separate medical criteria for "Candidates" (Applicants - Chapter 6) and "Members" (Incumbents - Chapter 9). Further, in the Candidates section, you will find that applicants who have "Category A" conditions are denied employment without any further individualized assessment. Specifically you will find:

"6.2.2 Candidates with Category A medical conditions shall not be certified as meeting the medical requirements of this standard.

6.2.3 Candidates with Category B medical conditions shall be certified as meeting the medical requirements of this standard only if they can perform the essential job tasks without posing a significant safety and health risk to themselves, members, or the public."

As an example, consider an individual who has had a myocardial infarction (heart attack). If that individual would have either cardiac stents or coronary artery bypass surgery (CABG), as a current employee, that person would be allowed to return to the position he or she previously held if that individual met specific requirements (see 9.4.3.1). But if that same individual would be applying to new Fire Department, the "history of a myocardial infarction" would be a Category A condition and the individual would be automatically rejected for employment consideration without further or individual evaluation being relevant (see 6.10.1.1 (1)).

Even apart from the medical discussion above, I believe that the current NFPA 1582 Standard removes from the employer the flexibility to provide reasonable accommodation. Such accommodation may be available in one Fire Department - based on the requirements of that specific position and the resources available in that specific Fire Department - but instead of allowing that "reasonable accommodation", NFPA 1582 substitutes a fixed automatic decision of rejection for employment that applies to all applicants with that medical diagnosis instead of one based on individual consideration made by the employer on a case by case basis.

Or more generally, the NFPA 1582 Standard not only violates federal law, it also usurps the prerogative of a Fire Chief to determine when a reasonable accommodation can be made.

Therefore, I believe that:

1. the current separation of medical criteria into separate chapters for applicants and current employees is without a scientific basis for that distinction,

2. the classification of "Category A" conditions which result in automatic rejection for employment eliminates the ability of an employer to provide "reasonable accommodation", which is required by federal law, and

3. the Technical Committee needs to request a presentation by an Employment Law attorney retained by NFPA who can educate the Technical Committee regarding the legal consequences to an employer who elects to follow the guidance contained in NFPA 1582.

As a remedy to these issues, I request that:

1. medical criteria for applicants and current employees should be identical,

2. all individuals which do meet the single set of medical criteria will need an individual evaluation to determine if "reasonable accommodation" is appropriate, and

3. guidance from an Employment Law attorney should be provided to the Technical Committee by NFPA to provide an orientation to the legal considerations relevant to this issue of which the Technical Committee members may not be aware.

Statement of Problem and Substantiation for Public Comment

The current content of NFPA 1582 violates the Americans with Disabilities Act (ADA) as well as rulings from the Equal Employment Opportunity Commission (EEOC). If an employer follows the current content NFPA 1582, the employer would be subject to penalties of violating these federal laws.

The separation of medical criteria into individual chapters implies that there is a medical or scientific basis for this division based on the individual's employment status. In fact, the only applicable medical criteria is whether an individual can safely perform the essential job functions, without regard to whether that individual is a current employee or an applicant. If the individual cannot perform the essential job functions, an individual assessment must be performed to determine if a "reasonable accommodation" for the individual is feasible. The current version of NFPA 1582 would have an employer reject an applicant without performing an individual assessment or considering if reasonable accommodation is feasible.

Related Item

• Chapter 6 and Chapter 9 changes	• Public Input No. 46-NFPA 1582-2019 [Chapter 6]	• Public Input No. 20-NFPA 1582-2018 [Section No. 6.2.2]	• Public Input No. 21-NFPA 1582-2018 [Section No. 6.2.3]	• Public Input No. 13-NFPA 1582-2018 [Global Input]

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Public Comment No. 2-NFPA 1582-2019 [Section No. 6.5.1.1]

6.5.1.1

Category A medical conditions shall include the following:

(1) * Clinically significant coronary artery disease, including history of myocardial infarction, angina pectoris, coronary artery bypass surgery, coronary angioplasty, and similar procedures

(2) * Cardiomyopathy or congestive heart failure, including signs or symptoms of compromised left or right ventricular function or rhythm, including dyspnea, S3 gallop, peripheral edema, enlarged ventricle, abnormal ejection fraction, or inability to increase cardiac output with exercise

(3) * Acute pericarditis, endocarditis, or myocarditis

(4) * Syncope, recurrent

(5) * Any medical condition requiring an automatic implantable cardiac defibrillator, unless the condition no longer requires an automatic implantable cardiac defibrillator; or a medical history of ventricular tachycardia or ventricular fibrillation due to ischemic or valvular heart disease, or cardiomyopathy

(6) Third-degree atrioventricular block

(7) * Cardiac pacemaker, if the applicant is pacemaker-dependent

(8) Hypertrophic cardiomyopathy, including idiopathic hypertrophic subaortic stenosis

(9) Any cardiac condition that results in the candidate not being able to perform one or more of the essential job tasks

(10) Heart transplant

2,5,8 and possibly others should be a case by case basis. The decision should come from the firefighters doctor or doctors that know his or her exact case. A decision should not be made by off a standard written by someone who has no knowledge of the patients history. Every case of hcm and or icd are different.

Statement of Problem and Substantiation for Public Comment

Fair decisions on a firefighters health and being a firefighter. Decisions should be made by the individuals specialists and not just a piece of paper by someone who doesn't know the individuals exact medical case since every case is different.

Related Item

• medical issues should be a case by case situations

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Committee:	FIX-AAA

Public Comment No. 1-NFPA 1582-2019 [Section No. 8.2.2.3]

8.2.2.3

An evaluation of muscular endurance shall be conducted using each of the following protocols:

(1) Push-up evaluation *(See C.2.1.9 for the protocol.)*

(2) ~~Curl-up evaluation~~ Static plank evaluation *(See C.2.1.11 for the protocol.)*

Statement of Problem and Substantiation for Public Comment

There is no curl up at the reference. It's a static plank reference at C.2.1.11.

Related Item

• C.2.1.11

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Committee: FIX-AAA

Public Comment No. 2-NFPA 1584-2019 [Section No. 6.9.2]

6.9.2*

A transport-capable basic life support (BLS) ambulance or equivalent personnel and equipment shall be the minimum level of available care.

Statement of Problem and Substantiation for Public Comment

Current wording implies that a staffed ambulance is needed at all events requiring FF rehab. This is not ordinarily feasible at many fire training academies, drills or other training situations yet all of these locations typically provide the same personnel and equipment (sans the actual ambulance vehicle) at the rehab operation.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1-NFPA 1584-2019 [Section No. A.6.4.4.1(1)]	

Related Item

- PI 12-NFPA 1584-2019

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Committee: FIX-AAA

Public Comment No. 1-NFPA 1584-2019 [Section No. A.6.4.4.1(1)]

A.6.4.4.1(1)

These symptoms could be indicative of serious medical issues including, but not limited to, cardiac events and carbon monoxide poisoning. These members should undergo immediate medical assessment.

Carbon monoxide (CO) is a colorless, odorless gas present in every fire. Symptoms of CO poisoning are nonspecific and easy to miss. Any fire fighter exposed to CO or presenting with headache, nausea, shortness of breath, or gastrointestinal symptoms at an incident where CO is present should be assessed for carbon monoxide poisoning.

Carbon monoxide readily attaches to hemoglobin in the bloodstream and is measured as a percentage of carboxyhemoglobin saturation (COHb). At an incident scene, carbon monoxide can be measured with a portable exhaled breath CO monitor designed to measure carboxyhemoglobin or a CO-oximeter (a pulse oximeter designed to measure carboxyhemoglobin) . Nonsmokers' COHb levels are normally 0 percent to 5 percent and smokers' are normally 5 percent to 10 percent.

Statement of Problem and Substantiation for Public Comment

inserting this text would match the text included in A.6.9.5 (1)

Related Item

• PI 10-NFPA 1584-2019

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