

## PURCHASING SPECIFICATION

### CAIRNS Invader 664<sup>™</sup>, 1971-2007 REVISION

#### Purpose

To supply a purchasing specification for a structural firefighter's helmet with a fiberglass composite shell.

#### Scope

The scope of this purchasing specification encompasses design, construction, materials and performance criteria deemed necessary for helmets utilized in structural firefighting.

#### General

Helmets manufactured in accordance with this specification are designed to meet the requirements of NFPA 1971-2007-edition standard for firefighter helmets.

**NO EXCEPTIONS, DEVIATIONS OR DELETIONS TO THIS SPECIFICATION WILL BE ACCEPTED.**

#### Manufacturer's Warranty

Helmets shall be warranted, for the lifetime of the helmet, to be free of defects in material and workmanship. The manufacturer shall guarantee, for a period of five (5) years from the date of manufacture that any helmet shell will be replaced free of charge if it is damaged beyond use while worn during normal assigned fire ground activities. The manufacturer shall be relieved of any replacement liability under this guarantee if there has been a failure to follow the manufacturer's maintenance requirements supplied with each helmet. Please refer to the official warranty policy #3600-09 for details.

#### Helmet

##### Helmet Shell

The Invader 664 shall be of European Fire Service Style. The shell shall have a down-sloping brim to enhance water shed. The radius of the juncture of the brim and crown shall be no less than 0.1875" to maximize deflection of debris and impact protection.

The Invader 664 helmet shell material is a DuraGlas® composite, consisting of a high-temperature-, flame-, and chip-resistant "through-colored" thermoset resin, reinforced with 1" and 2" chopped fiberglass, which is compression-molded to form a one-piece shell.

The shell dimensions (w/ edge trim) shall be 14.00" in length, 11.13" in width and have a crown depth of 5.9". The shell shall have a nominal wall thickness of 0.065".

The shell shall have black, or white\*, high-temperature, flame-resistant, flexible edge trim composed of an aluminum-cored, thermoplastic rubber (TPR). The edge-trim is secured around the entire brim of the helmet by crimping the aluminum core, and secured at the mating ends with a high-temperature adhesive and clamped by the helmet hangar clip at the edge of the rear brim.

The shell shall have a helmet hanger comprised of a ¾", nickel plated "D" ring and a stainless steel clip. The helmet hanger shall be attached to the center rear of the brim.

\* Available on white helmet shells only.

<b>Impact Liner</b>
The Invader 664 helmet shall include an impact liner, which is comprised of a rigid-cell, high-temperature urethane foam cap attached to a flame-resistant thermoplastic PPO inner liner. The impact liner shall be modular and field-removable for periodic inspection of the foam's integrity. The impact liner is incorporated to provide increased thermal and impact protection.
<b>Head Suspension</b>
The Invader 664 shall consist of a 6-way head suspension system, attached to the impact cap. The head suspension system comprises three (3) fixed 0.75" wide nylon straps mounted at six points on the impact liner and fastened at their intersection to form the 6-way overhead strap assembly. The straps are attached to the impact cap by means of a rigid plastic strap that locks the straps into a routed annular groove in the impact cap.
<b>Sizing Adjustment</b>
The size of the headband may be adjusted to fit the wearer's head by means of a ratchet adjustment system. The headband shall have a head size range of 6-3/8 to 8-3/8, adjustable in 1/8 increments. The head band is attached to the sides of the impact cap liner by four (4) flexible retention tabs. The rear ratchet arms shall have three (3) adjustable positions so that the angle of the ratchet may be set to accommodate the nape of the wearer's head.
<b>Comfort Liner</b>
The Invader 664 shall have a comfort liner, which consists of a headband cushion liner and a ratchet pad, which are removable. Both components are produced from a foam-core laminate system, which is composed of a soft black flame-resistant flannel material against the user's head and backed by a soft loop material which will be secured to the headband and the ratchet with hook fastener. The comfort liner is machine-washable, and can be easily upgraded to a leather-lined deluxe version.
<b>Chinstrap</b>
The chinstrap shall be constructed of three (3) pieces (or sections) of 3/4" wide, spun-Nomex® webbing, which are connected by a high-temperature, super-tough, thermoplastic quick-release buckle on the left side of the helmet, and by a cast zinc postman's slide buckle on the right side of the helmet.
The chinstrap is attached at either end of the impact cap by means of the tubular plastic ring, joined at the ends by an elastomeric tube that locks the chinstrap into a routed annular groove in the impact cap.
The long middle section, with the female half of the quick-release buckle sewn to the left end, shall pass through the postman's slide buckle on the right, and include hook-and-loop fastener for stowage of extra strap. The middle section shall be a minimum of 23.0" in length and the total length of the chinstrap shall be 35.0" at full extension, end to end.

<b>Shell Release Provisions</b>
The impact liner, complete with suspension system and chinstrap assembly (retained as described above) shall be retained to the helmet shell by means of two (2) thermoplastic retention clips mounted under the faceshield pivot hardware, and by four (4) pieces of hook-and-pile fastener sections between the impact liner and helmet shell in the crown area. This design will enable the shell to be released from the helmet when impacted from below the brim, reducing the chance of being injured by the chinstrap, and leaving the impact cap on the wearer's head for continued thermal and impact protection.

<b>Ear/Neck Protection</b>
The Invader 664 provides for ear and neck protection with a 6.5" wide, 19.0" long, full-cut earlap. The earlap consists of a 4.5 oz. / yd', yellow or black colored Nomex® outer-shell, and a flame resistant black flannel inner-liner. The earlap shall be secured to the impact liner by pieces of hook and pile fastener in no less than five (5) locations.
The earlap is machine washable and can be easily upgraded to a PBI/Kevlar earlap. The ear and neck protector shall be removable without interfering with the overhead strap assembly in any way

and without removing any part of the helmet's suspension.

### Eye Protection Options

Defender® Visor	The helmet shall have an integral visor system that retracts between the helmet shell and impact cap. The visor system shall be a wrap-around design, 4.5" high and 8.25" long. The lens shall be optically corrected to eliminate distortion. The lens of the visor system shall be available in clear or Tuffshield (yellow tinted) standard colors. Optional Tinted (Gray Smoked) and Mirrored finish lenses shall also be available. The lens shall be able to be quickly replaced without the use of tools.
Faceshield	The faceshield shall be a wrap-around, high pivot design, 4.5" wide, 18.0" long and 0.150" thick. The lens material shall be high performance, high temperature resistant thermoplastic. The lens shall be coated with a scratch resistant coating on both inner and outer surfaces to protect the lens from abrasions.
Faceshield Hardware	The faceshield shall be mounted to the helmet shell by means of two (2) glass-reinforced, high-temperature and flame-resistant thermoplastic bracket assemblies, with adjustable thermoplastic knobs one (1) on either side of the helmet shell. The brackets allow the faceshield to pivot above the helmet shell when it is not in use.
Goggle System	The goggle system shall be comprised of a high-temperature, flame- and impact-resistant goggle lens and frame, a flame-resistant, elastic goggle strap, and a goggle retention system. This retention system will lock the goggle onto the helmet at the back brim, which will prevent loss of the goggle when it is stowed or in the donned position. The goggle can also be attached to the helmet with side mounted hardware. This will allow the goggle to be stored in the front or back position of the helmet. The straps can be attached to the side hardware by means of lock down nuts through the straps or by a quick release fastener. Both inner and outer surfaces of the goggle lens will have an anti-scratch and anti-fog coating. Both ends of the lens will be reinforced with a fiberglass insulating label for extra durability at elevated temperatures. The lens will be low profile, optically correct with a nominal thickness of 1/16". The goggle strap will require a one time adjustment which facilitates donning while wearing gloves.

### Retro-Reflective Trim

The helmet shall have four bar-shaped pieces of lime-yellow, retro-reflective fluorescent Reflexite® trim around the exterior of the crown of the helmet shell. There shall be an additional piece of bar-shaped Reflexite® trim on the exterior slope of the rear brim for maximum daytime and nighttime visibility. Red-orange & lime yellow retro-reflective, fluorescent Scotchlite® bars are also available.

### Performance Criteria & Verification Data Requirement

The 660C Metro helmet shall meet the requirements of NFPA 1971-2007 edition, US-OSHA (CFR 1920) NBSIR 1977, and CAL-OSHA. The request of only a Bourke lens on this helmet reduces the certification to US OSHA (CFR 1920) NBSIR 1977.

Response to this specification shall include a current NFPA 1971-2007 Certificate of Conformance test report from an accredited test facility for the helmet offered. This certification testing is conducted annually as per NFPA requirements.

### Options

A full array of products is available, such as flannel and leather liners, Nomex and PBI/Kevlar earlaps, and custom visor and goggle options. Please see our catalog and contact a Cairns representative for a custom configuration.

### Maintenance, Repair and Retirement

Upon the customer's request, training will be provided, explaining the proper maintenance, repair, and retirement of the helmet.