CAR #	33	TEAM NAME	Manab Racing	EVENT	Formula Bharat 2021

IMPACT ATTENUATOR DESIGN REPORT
FORMULA BHARAT 2021

CAR #	33	TEAM NAME	Manab Racing
		SCHOOL NAME	Haldia Institute of Technology

CONTACT NAME	Aman Sagar
CONTACT EMAIL	manabracing.hit@gmail.com

Material(s) Used	Dow IMPAXX™ 700 foam
Description of form/shape	Frustum (Trapezoidal)
IA to Anti-Intrusion Plate mounting method	Loctite Adhesive
Anti-Intrusion Plate to Front Bulkhead mounting method	Welded (TIG Welding)
Peak deceleration (<= 40 g's)	
Average deceleration (<= 20 g's)	

Length (fore/aft direction) (mm)	300	Width (lateral direction) (mm)	220	Height (vertical direction) (mm)	202
	(>=200mm)		*(>=200mm)*		*(>=100mm)*

Confirm that the attenuator contains the minimum volume 200mm long x 200mm wide x 100mm high	✓

IMPACT ATTENUATOR DESIGN

☑ **"Standard Design"** ☐ **"Own Design"**

ATTACH PROOF OF EQUIVALENCY

TECHNICAL COMMITTEE DECISION/COMMENTS

APPROVED BY:		DATE:	

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IA to AIP Mounting Method (Material Specifications)

Name of the material: Loctite 495

Overview

LOCTITE 495 is a transparent, colourless, low-viscosity, general purpose instant adhesive offering quick bonding. It can be used to bond a wide range of materials, including plastics, rubbers and metals.

- Bonded Material: Metal/Plastic/Rubber
- Gap Fill: Up to 0.1 mm
- Colour: Ultra Clear
- Fixture Time: 20 Seconds
- Viscosity (cP): 45
- Temperature Resistance (Continuous): 120°C
- Shear Strength (N/mm^2): 2750 psi (19)
- Standard Shelf Life (In Days): 450

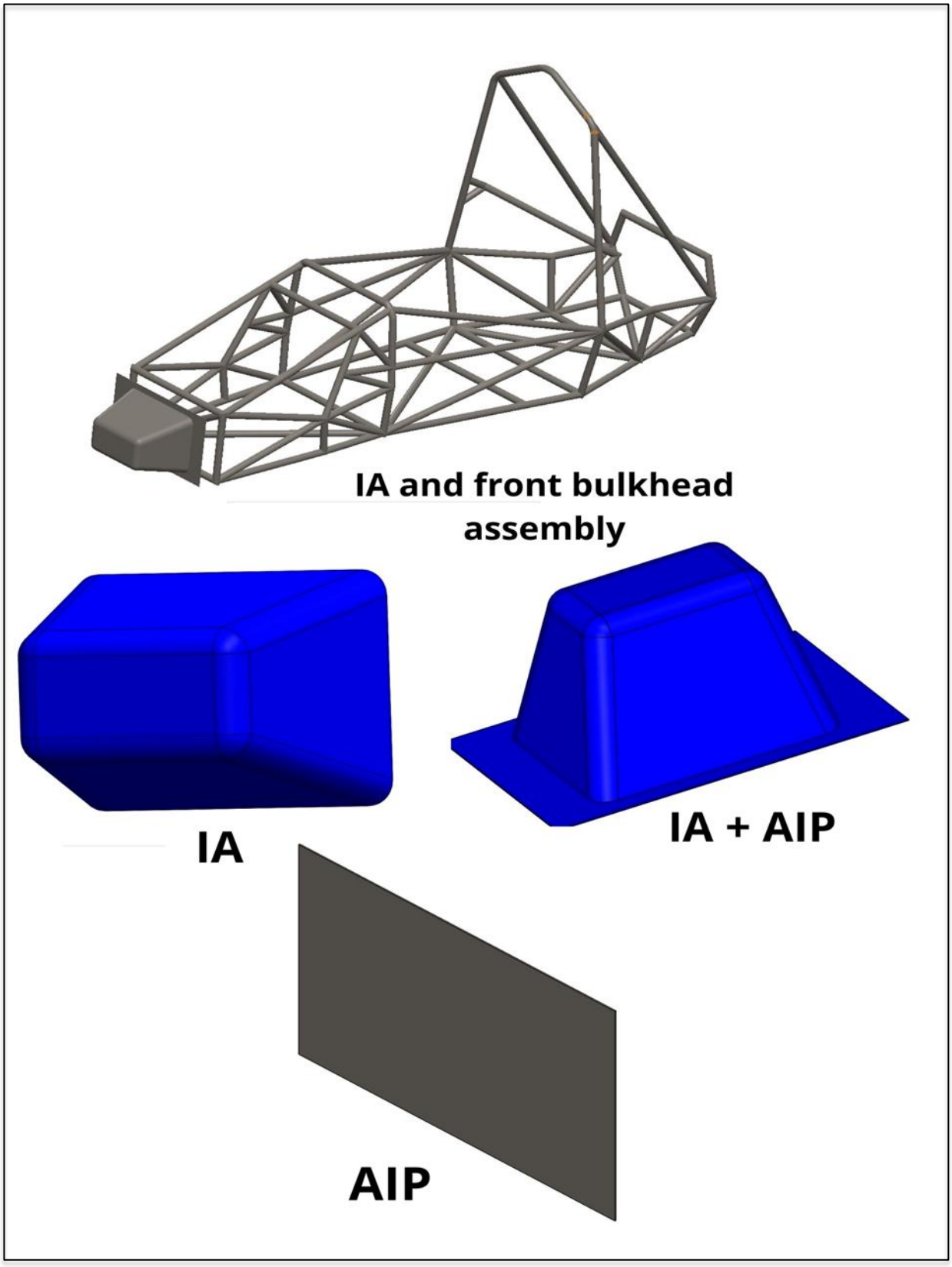
AIP to Front Bulkhead Mounting Method

Welding Type: TIG Welding

- Work piece = AIP + Front Bulkhead
- TIG Welded joint –> Lap joint
- Uses a non-consumable tungsten electrode during the welding process
- Uses a number of shielding gases including helium (He) and argon (Ar)
- Produces very high-quality, superior welds
- Provides precise control of welding variables (i.e. heat)
- Welding yields low distortion
- Leaves no slag or splatter

CAR #	33	TEAM NAME	Manab Racing	EVENT	Formula Bharat 2021

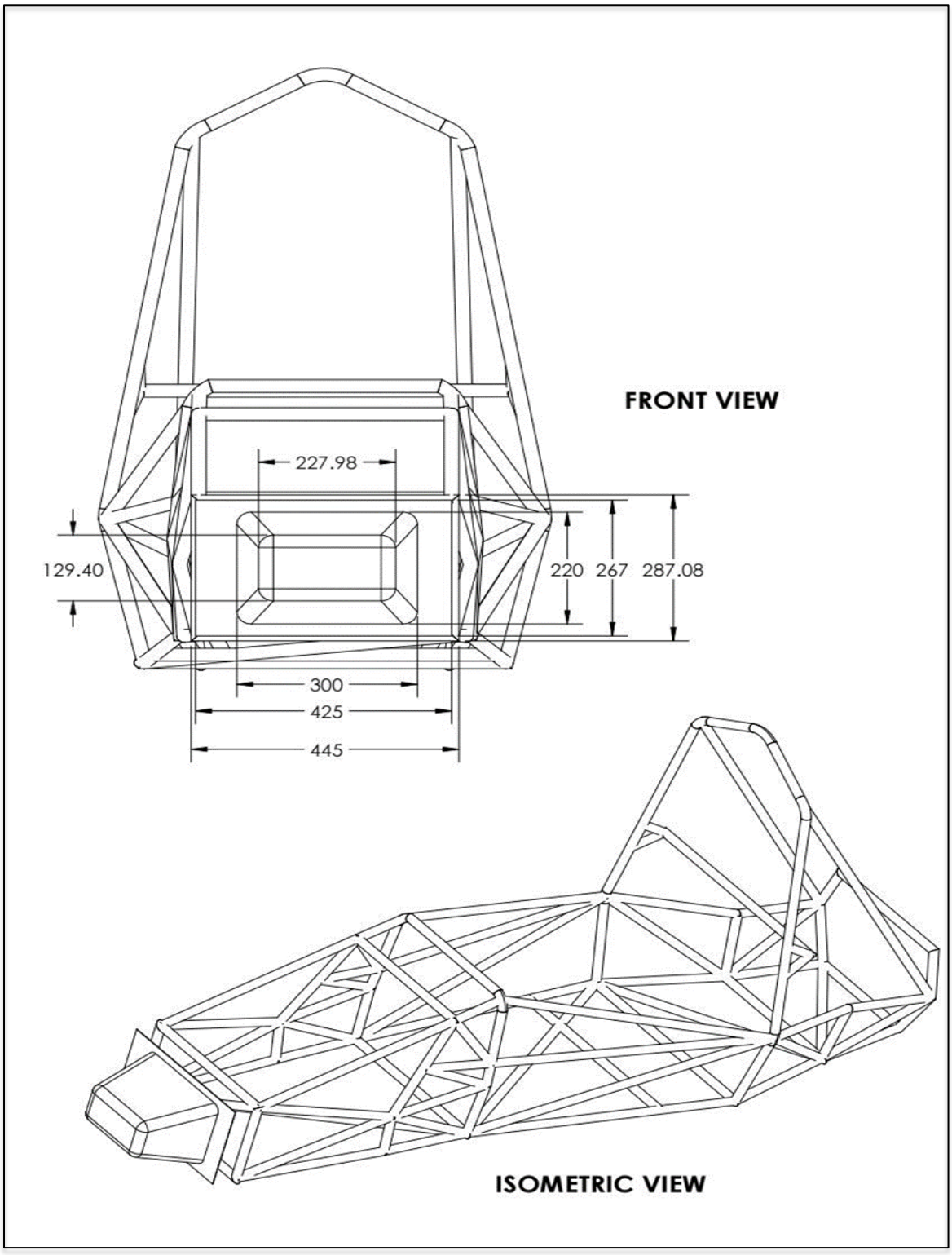
CAD MODEL



CAR #	33	TEAM NAME	Manab Racing	EVENT	Formula Bharat 2021

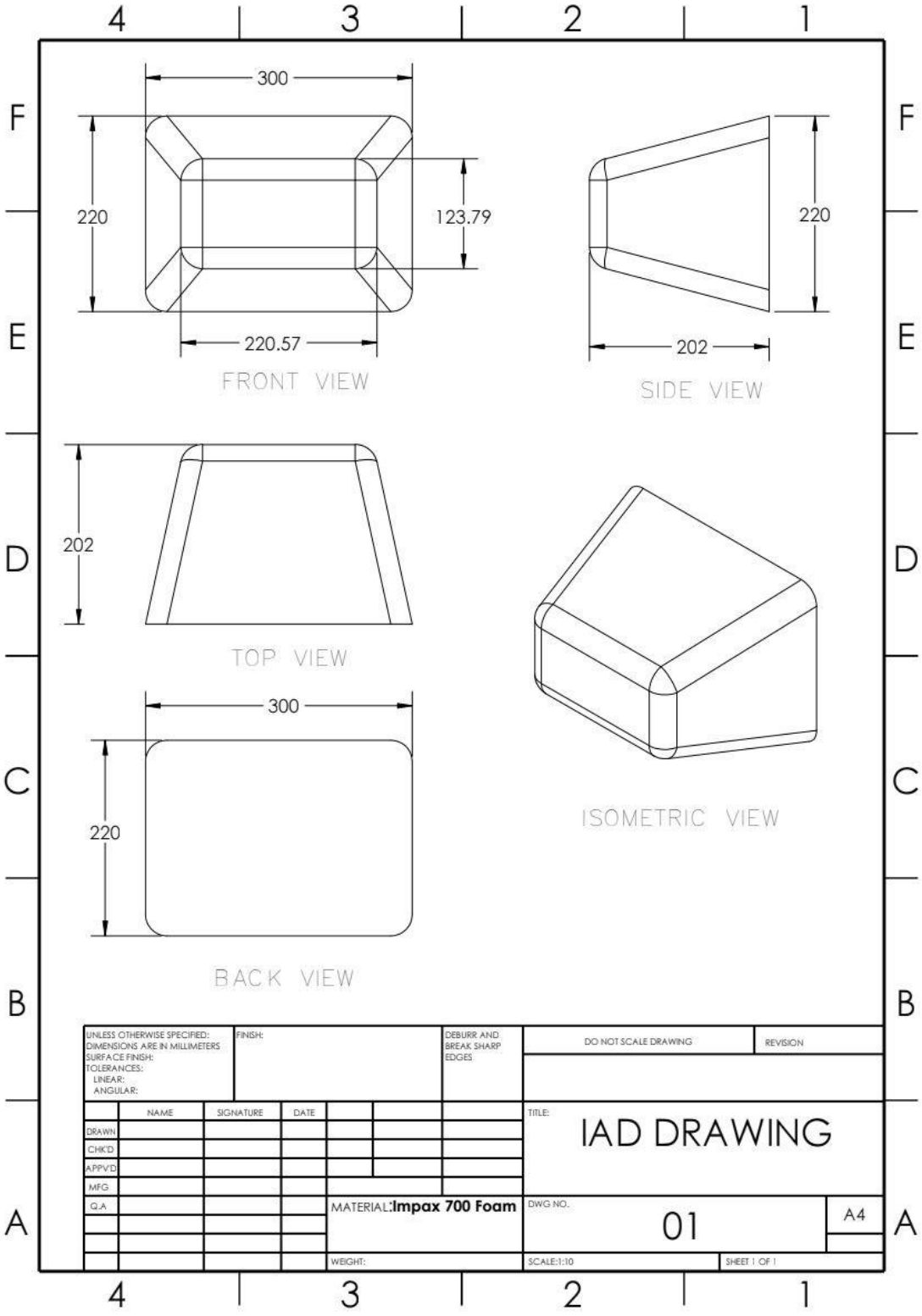
1. TECHNICAL DRAWINGS

Fig. of IA with Chassis



CAR #	33	TEAM NAME	Manab Racing	EVENT	Formula Bharat 2021

1. Impact Attenuator



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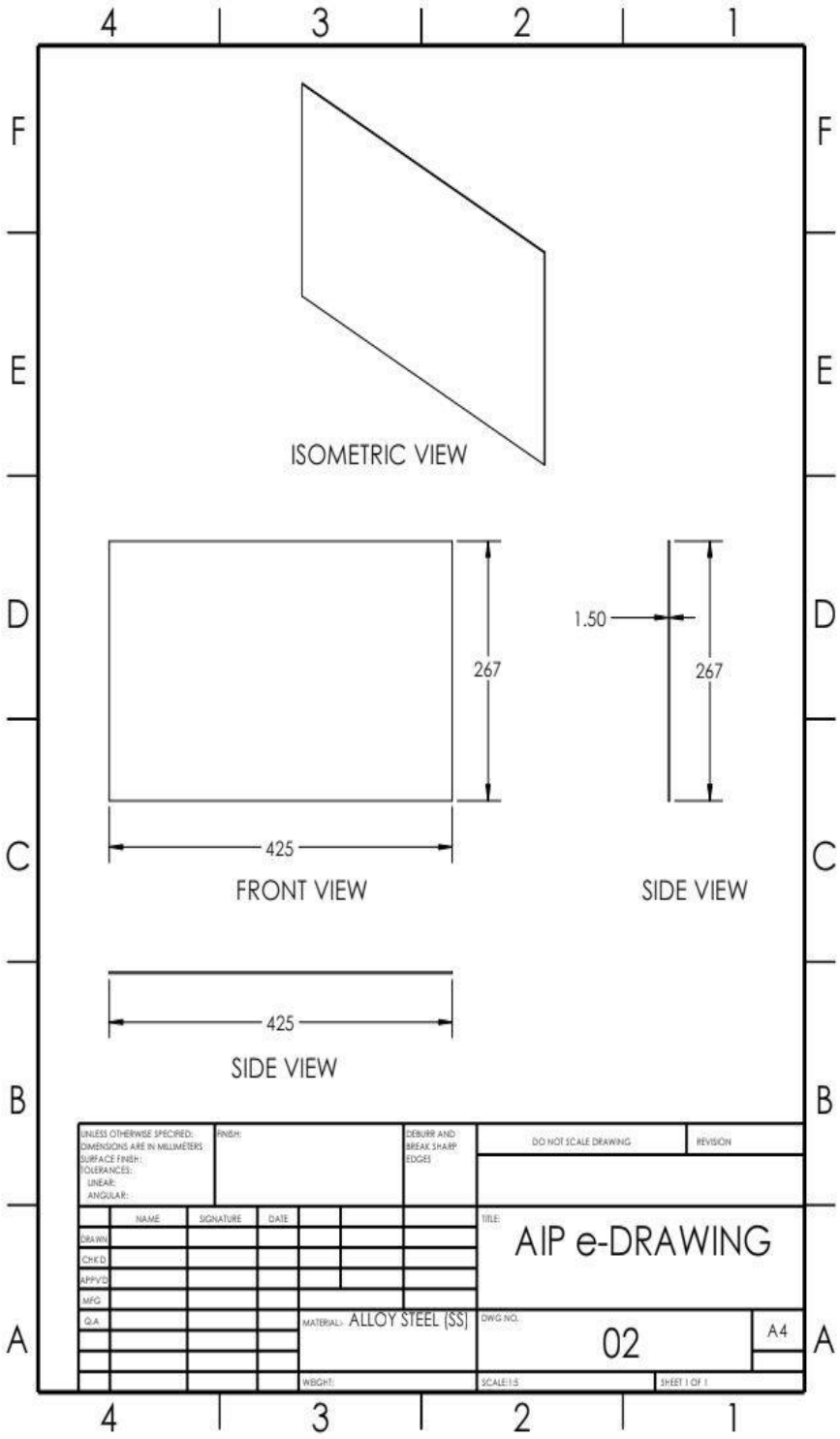
2. Anti-Intrusion Plate



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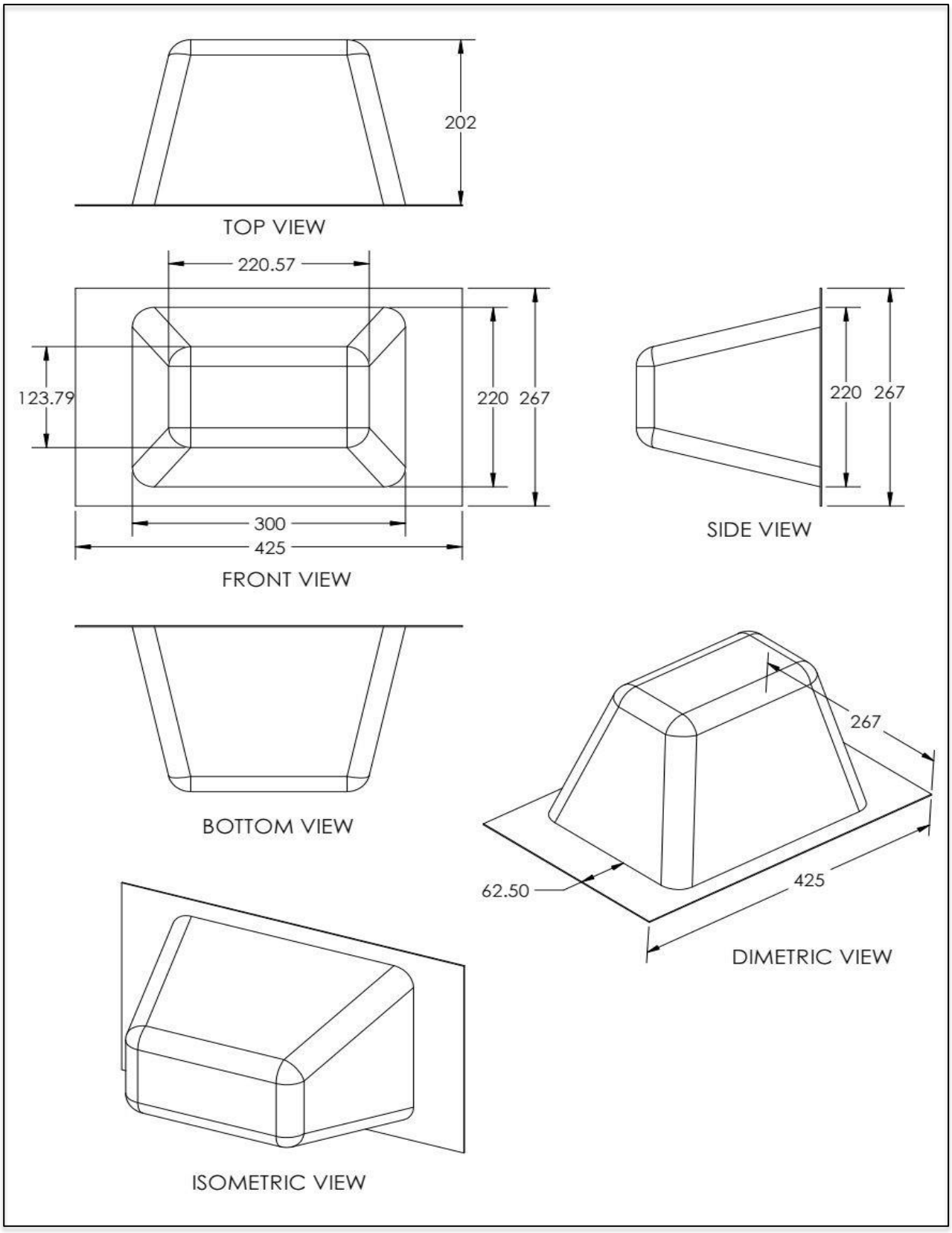
3. IA and AIP Assembly



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2. RECEIPT

QUOTE R-557

3brothers machination PVT. LTD
Shed no:- 7, Safal-1 Industrial estate, Bh. Fortune estate, road no. 8, Kathawada GIDC, Odhav, Ahmedabad, GJ (24) 382430, IN
+918469616186
info@3brothers.co.in
GSTIN: 24AABCZ3333M1Z7 Website: www.burnout.tech
Contact Name: Ritesh Varma

Amount Due: ₹30,090.00

Issue Date: 17 - Aug - 2021
Valid Until: 01 - Sep - 2021
Place of Supply: WB (19)

Quote To
Manab Racing , Haldia Institute of Technology
Haldia Institute of Technology, HIT college road, Kshudiram Nagar,Haldia,, Haldia, WB (19) 721657, IN
amansagar887@gmail.com 7004275370

Ship To
Haldia Institute of Technology, HIT college road, Kshudiram Nagar,Haldia,, Haldia, WB (19) 721657, IN

S.No	Item Description	HSN/SAC	Qty UoM	Price (₹)	Taxable Value (₹)	IGST (₹)	Amount (₹)
1	Impact Attenuator Made of DOW Impaxx 700 Form	8466	1.00 PC	24,500.00	24,500.00	4,410.00 18%	28,910.00
	Shipping & Packaging charges				1,000.00	180.00 18%	1,180.00
				Total @18%	25,500.00	4,590.00	30,090.00

Bank Name: IDFC BANK
Account Number: 10040109529
Branch Name: Chandkheda ,AHMEDABAD
IFSC Code: IDFB0040101 UPI :-burnout@idfcbank

Total Taxable Value	₹25,500.00
Shipping & Packaging charges	₹1,000.00
Total Value (in figure)	₹30,090
Total Value (in words)	₹ Thirty Thousand Ninety Only

Terms

1) Payment terms are in 50% Advance & 50% before dispatch.
2) All disputes in any regard are subject to the legal jurisdiction of Ahmedabad, India.
3) Our responsibility ceases absolutely as soon as the Goods leave our premises.
4) Delivery will in 20 - 25 days after advance received.
5) Price are as per new product developed with respect to Quality and time.
6) Gst extra.

Provider Signature

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3. Data Sheet

IMPAXX™ 700 Energy Absorbing Foam

IMPAXX™ 700 Energy Absorbing Foam is a higher- performing, and lower-cost alternative to traditional energy absorbing solutions such as polyurethane and expanded polypropylene bead foams.

IMPAXX foam is a highly engineered, extruded, thermoplastic foam that utilizes Dow proprietary process technology to maximize efficiency and minimize *weight*. It is a strong, *low-density*, closed-cell foam.

IMPAXX foam is highly suited for applications in a variety of industries requiring enhanced safety features through energy absorbing countermeasures.

Sizes available: sheets, basic blocks and custom-fabricated parts. Color: Blue

Physical Properties[1]	Test Method	Direction	Value U.S. / Metric
Density	ASTM D 3575, Suffix W, Method B DIN 53420	N/A	2.8 pcf 45 Kg/m^3
Compression Strength	ASTM D1621, 23°C		Psi / kPa
@ 10%		Vertical	101 / 700
@ 25%		Vertical	104 / 718
@ 50%		Vertical	121 / 835
Compression Strength	ASTM D1621, -15°C		Psi / kPa
@ 25%		Vertical	114 / 788
@ 50%		Vertical	138 / 954
Compression Strength	ASTM D1621, 60°C		Psi / kPa
@ 25%		Vertical	73 / 504
@ 50%		Vertical	85 / 586
Thermal Stability (linear change @ 80°C)	ASTM D 3575, Suffix S or DIN 53431	N/A	< 2%
Flammability**	FMVSS 302	Extrusion	Pass
Fogging	SAE J1756		100 Fog Number
Water Absorption	ASTM D3575, Suffix L	N/A	6%

(1) The data presented for this product is for un-fabricated foam. While values shown are typical of the product, they should not be construed as specification limits.

** Results from this test do not represent performance under actual fire conditions.

IMPAXX™ foam is globally available. It is an environmentally-friendly, recyclable material and meets governmental flammability requirements for interior automotive components.
IMPAXX foam is a non-CFC, non- HCFC, non-HFC material.

IMPAXX foam is available in a variety of densities and sizes and offers low weight to EA performance characteristics required for automotive applications. IMPAXX foam weighs less than other energy absorbing foams of similar strength. IMPAXX™ foam characteristics remain stable at cold temperatures including -30°C.

Typical automotive applications include:

- Headliner Head Impact Countermeasures
- Pillar Head Impact Countermeasures
- Side Impact Door Countermeasures
- Bumper Systems
- Front Impact Bolster Systems
- Lower Leg Impact Protection
- Structural Panels
    - Load floors
    - Sun shades
    - Sun visors

IMPAXX foam has multiple attachment methods such as: pressure-sensitive tapes and hot-melts, mechanical screws and clips, heat-staking, sonic welding, plus others.

Safety and Handling Considerations

Material Safety Data (MSD) sheets for IMPAXX 700 foams are available from Dow. MSD sheets are provided to help customers satisfy their own handling, safety, and disposal needs.
IMPAXX™ energy absorbing foam meets the requirements of the U.S. Clean Air Act Amendments.

The fabrication of plastic foam can result in the generation of dust. Dust resulting from sawing, filing, and sanding of plastic parts may cause irritation to the eyes and upper respiratory track. Workers should wear appropriate eye protection and protective clothing.

Disposal
Do not dump into sewers, on the ground, or into any body of water. The preferred disposal method is to send to a licensed recycler, re-claimer, or incinerator. All disposal methods must be in compliance with Federal/State/Provincial and local laws and regulations. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Contact the Dow Customer Service Center for further details.

Combustibility
IMPAXX™ 700 foam is combustible and should not be exposed to flame or other ignition sources.

Product Features

As the properties listed on the reverse side suggest, IMPAXX™ 700 Energy Absorbing Foam offers good strength, vibration and shock absorbency and water resistance characteristics.
IMPAXX 700 Energy Absorbing Foam meets the requirements of the
U.S. Clean Air Act Amendments. It is easily fabricated and non- abrasive.