CATALOG PRICE

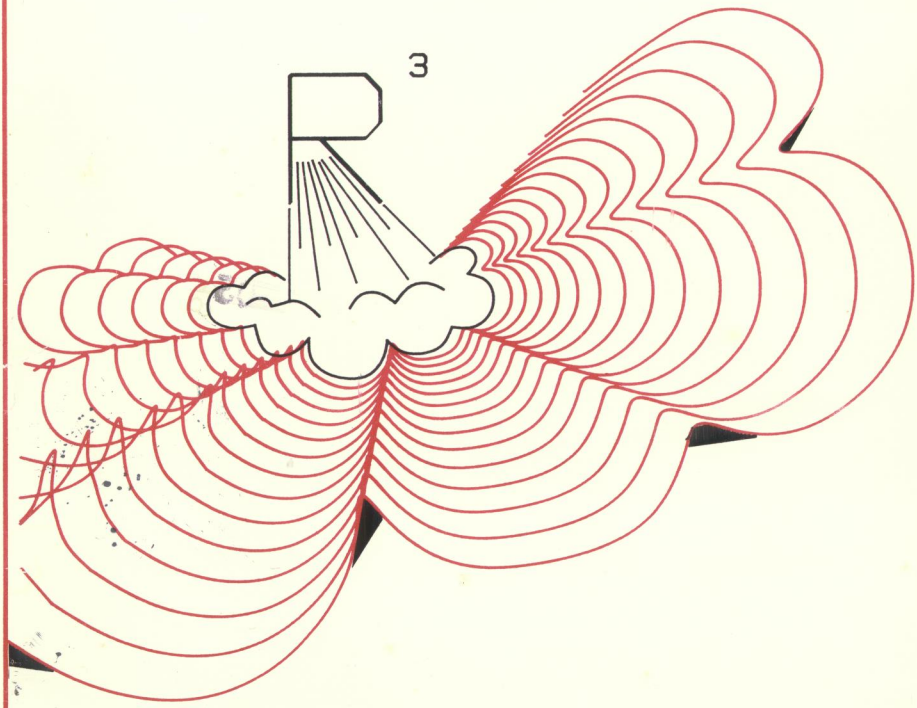
$ 1.00

HIGH PERFORMANCE

COMPOSITE ROCKET MOTORS

FROM

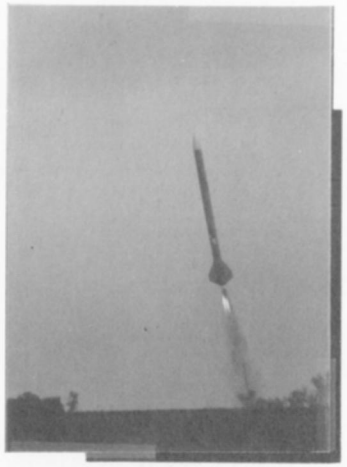
RAVENNA ROCKET RESEARCH



....MAKING OUR CLOUDS YOUR CLOUDS.

OUR PHILOSOPHY....

RAVENNA ROCKET RESEARCH RE EMERGES. THE DAY IS SATURDAY, OCTOBER 29TH. 1988. THE LOCATION: THE DANVILLE,ILLINOIS "CENTRAL BLAST-1" LAUNCH. ONE ROCKET WAS READIED THAT WOULD GIVE VISIBILITY TO OUR CAUSE -RELIABLE, HIGH PERFORMANCE ROCKET MOTORS. THE CANDIDATE WAS A ROCKET NEARLY NINE FOOT TALL, SIX INCHES IN DIAMETER, CONTAINING NINE OF OUR LARGEST, LONGEST BURNING MOTORS. THE LIFT-OFF WEIGHT OF THE ROCKET WAS 10.9 LBS., TOTAL NEWTON-SECOND RATING WAS 2,880 N/S, THE MAXIMUM COMBINED THRUST WAS 657 LBS. AND AN AVERAGE COMBINED THRUST OF 541.8 LBS. FOR A BURN DURATION OF NEARLY 2 1/2 SECONDS. THE FLIGHT WAS AWESOME. FOR THOSE WHO DIDN'T HAVE THE OPPORTUNITY TO SEE IT; ASK ANYONE THAT DID WHAT THEY THOUGHT OF IT. ALL NINE MOTORS IGNITIED SIMULTANEOUSLY.THE MOTORS PRODUCED THEIR EXPECTED IMPRESSIVE BURN AFTER WHICH NORMAL DELAY AND EJECTION FOLLOWED. A BEAUTIFUL 6 FOOT PARACHUTE BROUGHT THE ROCKET HOME ABOUT 2 MILES DOWNRANGE. YOU, THE CONSUMER,MUST UNDERSTAND THAT IF MOTORS HAVE ANY FUNCTIONAL PROBLEMS (I.E. PROBLEMS WITH IGNITION, ERRATIC BURN, HIGH OR LOW PRESSURE CONDITIONS ECT.) THEY WILL CERTAINLY BE OBVIOUS IN A CLUSTER OF NINE MOTORS! WHILE THIS WAS AN IMPORTANT EXAMPLE, IT WAS NOT THE ONLY EXAMPLE. DURING THE LAUNCH WE DEMONSTRATED MOTORS IN OTHER FLIGHTS AND SOLD A GREAT DEAL OF MOTORS TO OTHERS. WE ARE PROUD THAT 100% OF ALL MOTORS DEMONSTRATED OR SOLD AND FLOWN WORKED PERFECTLY AND IN FACT WITH COMMENTS OF PRAISE FROM MANY USERS. THIS IS WHERE RAVENNA ROCKET RESEARCH IS AT. THE PERFORMANCE AT "CENTRAL BLAST 1" WAS THE DIRECT RESULT OF OVER EIGHT MONTHS OF COMPUTER MODELED MOTOR DEVELOPMENT AND TESTING. WE DID THIS FOR YOUR ULTIMATE CONFIDENCE IN OUR PRODUCT. WE WILL ONLY MANUFACTURE AND SELL MOTORS WITH THE SAME ULTIMATE CONFIDENCE. IN FACT, IF ANY MOTOR MADE BY RAVENNA ROCKET RESEARCH FAILS TO PERFORM IT'S INTENDED FUNCTION (1), WE WILL GIVE YOU A DOUBLE REPLACEMENT OF THE SAME MOTOR TYPE. THIS IS OUR "SINGLE YOUR MOTOR FROWN....WE WILL DOUBLE YOUR MOTOR SMILE" ADVERTISED POLICY. SOONER OR LATER THE BEST PRODUCT SPEAKS FOR ITSELF AND WE ARE READY AND WAITING.



1.)- IF ANY MOTOR THAT RAVENNA ROCKET RESEARCH MANUFACTURES FAILS FUNCTIONALLY FOR ANY REASON, EXCLUDING PRE MATURE EJECTION OR LACK OF EJECTION DUE TO AIRFRAME JAM (I.E.- EJECTION CHARGE IGNITIED BUT NOSE CONE OR BODY SECTION FAILED TO SEPARATE), WE WILL REPLACE , AT OUR DISCRETION, THE USERS MOTOR WITH TWO MOTORS OF THE SAME TYPE. THE USER MUST SUBMIT SPENT MOTOR OR MOTOR COMPONENTS TO RAVENNA ROCKET RESEARCH FOR INSPECTION AND THE SUBSEQUENT MOTOR REPLACEMENT. THE RETURN SHIPPING OF THE MOTOR-IN-QUESTION MUST BE PAID BY THE USER. RETURN OF REPLACEMENT MOTORS WILL BE PAID FOR BY RAVENNA ROCKET RESEARCH.

OUR PRODUCT....

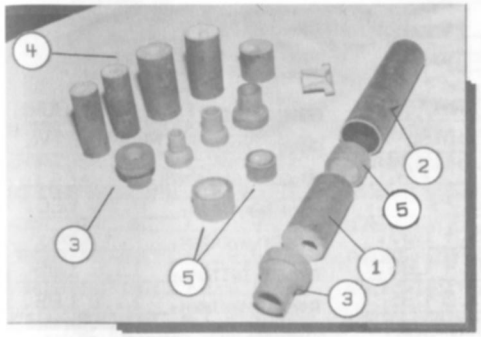


PHOTO #3

PHOTO #4

WELCOME TO THE NEW REALM OF "MIX'N'MAX". HIGH PERFORMANCE COMPOSITE ROCKET MOTORS DESIGNED TO BE THE BEST THE WORLD HAS TO OFFER. MOTORS SO CLOSE TO IDEAL PERFECTION THAT WE GUARANTEE THEM TO BE SO (1) OR DOUBLE YOUR MOTOR BACK! EACH MOTOR DESIGN WAS COMPUTER MODELED THROUGH DYNAMIC BURN SIMULATION SO AS TO EXTRACT THE MAXIMUM NEWTON-SECOND RATING FOR EACH CLASS WITHIN LONG TESTED MARGINS OF RELIABILITY. NEARLY EIGHT MONTHS OF TESTING FOLLOWED THE MODELING/DESIGN EFFORT PROVING THEIR SURVIVAL RATE SUPERIORITY. ALL MOTORS UTILIZE "CORE SEGMENTATION"; THE STACKING OF FUEL CARTRIDGES SO AS TO COMPILE OR ADD INDIVIDUAL FUEL CARTRIDGE ENERGY. THE ADVANTAGES OF CORE-SEGMENTATION ARE MANY IN NUMBER. ONE ADVANTAGE IS CONSISTENCY OF PRODUCTION. ANOTHER ADVANTAGE IS THAT OF A CAREFUL BALANCE OF HIGHER INITIAL BURN SURFACE AREA VERSUS BUFFERED FINAL BURN SURFACE AREA PRODUCING A "FATTER" THRUST CURVE. ALSO, A STANDARD "BASE-LINE" NEWTON-SECOND RATING FOR THE FUEL CARTRIDGE LENDS ITSELF TO MULTIPLES THEREOF FOR LARGER MOTOR CLASS FITTING. SEE PHOTO #3, ITEM #1). THE CASE MATERIAL IS FABRIC BASED PHENOLIC. WE HAVE FOUND SUPERIOR HEAT PRESSURE STRESS RESISTANCE OVER THAT OF PAPER PHENOLIC TUBING; THE COMPETITION'S CHOICE (SEE PHOTO #3, ITEM #2). OUR NOZZLE IS AS DIFFERENT FROM THE NORM AS OUR TUBING IS. WE USE A KILN-FIRED MOLDED REFRACTORY WITH FULL CONVERGING/DIVERGING SECTIONS (PER THROAT DIAMETER) FOR A HIGH CO-EFFICIENT OF THRUST. HAVING DONE EXTENSIVE RESEARCH INTO THE OTHER POSSIBLE CHOICES OF NOZZLE MATERIALS, OUR MATERIAL CHOICE OFFERED THE LEAST MEASURED ABLATION, LOWEST COST AND THE ABILITY TO CONTROL ALL NOZZLE FABRICATION PROCESSES "IN-HOUSE". THE NOZZLE SHAPE IS THAT OF A TOP HAT. THE WIDE PORTION MATCHES THE INSIDE DIAMETER OF THE PHENOLIC TUBING FOR EPOXY HEAT ISOLATION AND AXIAL ALIGNMENT. INCIDENTALLY, THE THERMAL COUPLING TO THE EPOXY IS LESS THAN THAT OF GRAPHITE OR CARBON BASED COMPOSITE NOZZLES; ANOTHER RELIABILITY PLUS. SEE PHOTO #3, ITEM #3 FOR EXAMPLES OF OUR MOLDED NOZZLES. THE COMPOSITE FUEL THAT WE USE IS BUTADIENE BASED AND OFFERS THE HIGHEST ENERGETIC LEVEL ALONG WITH SLOWEST BURN RATE OF ALL THE POSSIBLE POLYMER CHOICES. OTHER MOTOR COMPANIES INCLUDE BURN RATE MODIFIERS IN THEIR PROPELLANT; WE DO NOT.

A BURN RATE INHIBITOR SLOWS THE BURN RATE AND LOWERS ISP. THE ADDED HEAT OF LONGER BURN WITH LESS EFFICIENCY TRANSLATES TO MORE HEAT ENTER THE RELIABILITY FACTOR. GOING THE OTHER DIRECTION, THAT OF A BURN RATE ENHANCER, REDUCES BURN TIME AND RAISES ISP - THIS IS GOOD BUT AT THE PENALTY OF EVEN HIGHER BURN TEMPERATURES. BURN RATE ENHANCERS, IN GENERAL, ARE METALLIC. THEY, IN ADDITION TO RAISING BURN TEMPERATURE, CAUSE MORE NOZZLE ABLATING EXHAUST PRODUCTS. LAST BUT NOT LEAST ADDITIVES COST YOU MORE; BOTH IN ADDITIONAL BATCH PROCESSING TIME AND MATERIALS. OUR PROPELLANT ISP THEORETICAL AT Pc=1000/Pae=14.7 IS A NOMINAL 233. ONCE MIXED, OUR PROPELLANT IS CONSTANT-PRESSURE EXTRUDED INTO LONG CARDBOARD CASINGS, THEY ARE SEALED AT THAT PRESSURE AND REMAIN THAT WAY UNTIL CURED. THIS PROCESS INSURES CONSISTENT DENSITY WITHOUT AIR ENTRAPMENT. THESE CARTRIDGES ARE THEN PRECISION MACHINED INTO A STANDARD GEOMETRY SHARED WITH ALL MOTOR CLASSIFICATIONS. A SINGLE 29mm CARTRIDGE CONTAINS 31.25 GRAMS OF PROPELLANT AND PROVIDES JUST A SHADE UNDER 80 NEWTON SECONDS TOTAL IMPULSE CAPABILITY. THEREFORE, A TWO CARTRIDGE ARRAY WOULD PRODUCE JUST A SHADE UNDER 160 NEWTON SECONDS TOTAL IMPULSE WITH A FUEL "WEIGH IN" OF 62.5 GRAMS. BY DESIGN THEN, OUR MOTORS CANNOT BE OUT-PERFORMED BY THE COMPETITION; ONLY AT BEST EQUALED. SEE PHOTO #3 FOR EXAMPLES OF OUR FUEL CARTRIDGES (ITEM #4). THE DELAY CHARGE (SEE PHOTO #3, ITEM #5) CONSISTS OF A REDUCED DIAMETER CARTRIDGE OF COMPOSITE PROPELLANT SURROUNDED BY MACHINE-PRESSURE-WOUND CONVOLUTE TUBING. WE MACHINE ROLL THIS TUBING IN-HOUSE. THE COMBINATION OF TOUGH COMPOSITE DELAY AND PRESSURE WOUND CONVOLUTE TUBING FORM AN IMPENETRATIVE BULKHEAD (BARRIER) FOR THE DURATION OF BURN. BASED UPON YOUR CHOICE OF DELAY TIME, THE DELAY CARTRIDGE LENGTH WILL VARY; PRECISELY. SOME OF OUR COMPETITORS CHOOSE TO DEPTH DRILL A STANDARD LENGTH DELAY CARTRIDGE FOR THE TIME VARIATION. THIS ADDS POSSIBILITY OF ERROR AND REQUIRES ANOTHER CAREFUL MACHINE STEP; BUT THEN THAT IS THEIR PROBLEM. FINALLY, AN EPOXY CLOSURE SEALS THE MOTOR'S BACK END BUT NOT BEFORE A HOT-GAS PORT IS MOLDED IN PLACE. AGAIN A MACHINING STEP (DRILLING) IS CIRCUMVENTED. ANOTHER REPEATABLE RELIABILITY PLUS. A SMALL BLACK-POWDER EJECTION CHARGE AND ADHESIVE SEAL CAPS IT ALL.

3 AVENNA OCKET ESEARCH

....RESEARCH IN YOUR BEST INTEREST

CLASS 'C' MOTORS

20 N/S 22 MM

THE MIX 'N' MAX MOTOR SERIES

D12

GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1/2
BURN DURATION: 1.65 SEC.
THRUST-AVERAGE: 2.7 LBS.
THRUST-INITIAL: 6.9 LBS.
THRUST-MAXIMUM: 7.4 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 7/8'OD X 3 1/2'LG
WEIGHT TOTAL: 43.7 GRAMS
WEIGHT BURNOUT: 29.4 GRAMS
MASS RATIO: 0.673

D24

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUTRAL
NO.CORE SEGMENTS: 1/2
BURN DURATION: 0.79 SEC.
THRUST-AVERAGE: 5.4 LBS.
THRUST-INITIAL: 6.4 LBS.
THRUST-MAXIMUM: 7.0 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 7/8'OD X 3 1/2'LG
WEIGHT TOTAL: 41.7 GRAMS
WEIGHT BURNOUT: 30.0 GRAMS
MASS RATIO: 0.719

D33

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1/2
BURN DURATION: 0.56 SEC.
THRUST-AVERAGE: 7.4 LBS.
THRUST-INITIAL: 13.8 LBS.
THRUST-MAXIMUM: 13.8 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 7/8'OD X 3 3/4'LG
WEIGHT TOTAL: 41.3 GRAMS
WEIGHT BURNOUT: 32.0 GRAMS
MASS RATIO: 0.775

3 AVENNA OCKET ESEARCH

....RESEARCH IN YOUR BEST INTEREST

CLASS 'C' MOTORS

40 N/S 22 MM

THE MIX 'N' MAX MOTOR SERIES

E23

GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1
BURN DURATION: 1.73 SEC.
THRUST-AVERAGE: 5.2 LBS.
THRUST-INITIAL: 9.7 LBS.
THRUST-MAXIMUM: 12.4 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 7/8'OD X 4 1/2'LG
WEIGHT TOTAL: 56.1 GRAMS
WEIGHT BURNOUT: 32.7 GRAMS
MASS RATIO: 0.583

E39

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: PROGRESSIVE
NO.CORE SEGMENTS: 1
BURN DURATION: 1.03 SEC.
THRUST-AVERAGE: 8.8 LBS.
THRUST-INITIAL: 6.5 LBS.
THRUST-MAXIMUM: 12.5 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 7/8'OD X 4 1/2'LG
WEIGHT TOTAL: 54.1 GRAMS
WEIGHT BURNOUT: 33.4 GRAMS
MASS RATIO: 0.617

E76

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1
BURN DURATION: 0.50 SEC.
THRUST-AVERAGE: 17 LBS.
THRUST-INITIAL: 19.9 LBS.
THRUST-MAXIMUM: 19.9 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 7/8'OD X 4 3/4'LG
WEIGHT TOTAL: 52.5 GRAMS
WEIGHT BURNOUT: 35.2 GRAMS
MASS RATIO: 0.670

3 AVENNA OCKET ESEARCH

....RESEARCH IN YOUR BEST INTEREST

CLASS 'C' MOTORS

80 N/S 22 MM

THE MIX 'N' MAX MOTOR SERIES

F46

GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 2
BURN DURATION: 1.73 SEC.
THRUST-AVERAGE: 10.3 LBS.
THRUST-INITIAL: 19.2 LBS.
THRUST-MAXIMUM: 24.9 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 7/8'OD X 6 1/2'LG
WEIGHT TOTAL: 82.9 GRAMS
WEIGHT BURNOUT: 41.3 GRAMS
MASS RATIO: 0.498

F78

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: PROGRESSIVE
NO.CORE SEGMENTS: 2
BURN DURATION: 1.04 SEC.
THRUST-AVERAGE: 17.5 LBS.
THRUST-INITIAL: 13 LBS.
THRUST-MAXIMUM: 25 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 7/8'OD X 6 1/2'LG
WEIGHT TOTAL: 80.3 GRAMS
WEIGHT BURNOUT: 41.4 GRAMS
MASS RATIO: 0.516

F152

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 2
BURN DURATION: 0.53 SEC.
THRUST-AVERAGE: 34.1 LBS.
THRUST-INITIAL: 50 LBS.
THRUST-MAXIMUM: 50 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 7/8'OD X 6 3/4'LG
WEIGHT TOTAL: 78.4 GRAMS
WEIGHT BURNOUT: 45.1 GRAMS
MASS RATIO: 0.575

3 AVENNA OCKET ESEARCH

....RESEARCH IN YOUR BEST INTEREST

CLASS 'C' MOTORS

120 N/S 22 MM

THE MIX 'N' MAX MOTOR SERIES

G68

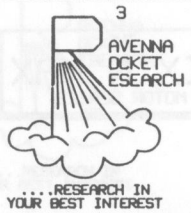
GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 3
BURN DURATION: 1.73 SEC.
THRUST-AVERAGE: 15.3 LBS.
THRUST-INITIAL: 30 LBS.
THRUST-MAXIMUM: 37.7 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 7/8'OD X 8 1/2'LG
WEIGHT TOTAL: 106.6 GRAMS
WEIGHT BURNOUT: 46.9 GRAMS
MASS RATIO: 0.440

G116

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: PROGRESSIVE
NO.CORE SEGMENTS: 3
BURN DURATION: 1.03 SEC.
THRUST-AVERAGE: 26 LBS.
THRUST-INITIAL: 19.8 LBS.
THRUST-MAXIMUM: 37.9 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 7/8'OD X 8 1/2'LG
WEIGHT TOTAL: 104.6 GRAMS
WEIGHT BURNOUT: 47.5 GRAMS
MASS RATIO: 0.719

G228

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 3
BURN DURATION: 0.53 SEC.
THRUST-AVERAGE: 51.2 LBS.
THRUST-INITIAL: 75 LBS.
THRUST-MAXIMUM: 75 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 7/8'OD X 8 3/4'LG
WEIGHT TOTAL: 101.7 GRAMS
WEIGHT BURNOUT: 52.4 GRAMS
MASS RATIO: 0.515



CLASS 'C' MOTORS

40 N/S
29 MM

THE MIX 'N' MAX MOTOR SERIES

E19

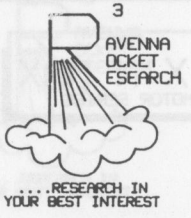
GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1/2
BURN DURATION: 2.18 SEC.
THRUST-AVERAGE: 4.3 LBS.
THRUST-INITIAL: 11.2 LBS.
THRUST-MAXIMUM: 11.6 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 1 1/8'OD X 3 3/4'
WEIGHT TOTAL: 78.7 GRAMS
WEIGHT BURNOUT: 51.8 GRAMS
MASS RATIO: 0.658

E33

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUT-REGR.
NO.CORE SEGMENTS: 1/2
BURN DURATION: 1.19 SEC.
THRUST-AVERAGE: 7.4 LBS.
THRUST-INITIAL: 11.5 LBS.
THRUST-MAXIMUM: 11.6 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 1 1/8'OD X 3 3/4'
WEIGHT TOTAL: 74.0 GRAMS
WEIGHT BURNOUT: 53.7 GRAMS
MASS RATIO: 0.726

E67

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1/2
BURN DURATION: 0.58 SEC.
THRUST-AVERAGE: 15 LBS.
THRUST-INITIAL: 24.8 LBS.
THRUST-MAXIMUM: 24.8 LBS.
TIME DELAYS: 0,5,8 SEC.
SIZE: 1 1/8'OD X 4'LG
WEIGHT TOTAL: 72.3 GRAMS
WEIGHT BURNOUT: 55.1 GRAMS
MASS RATIO: 0.762



CLASS 'C' MOTORS

80 N/S
29 MM

THE MIX 'N' MAX MOTOR SERIES

F35

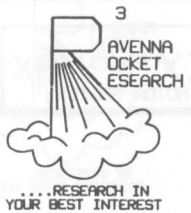
GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1
BURN DURATION: 2.18 SEC.
THRUST-AVERAGE: 7.9 LBS.
THRUST-INITIAL: 14.5 LBS.
THRUST-MAXIMUM: 17.7 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 4 3/4'
WEIGHT TOTAL: 101.5 GRAMS
WEIGHT BURNOUT: 58.5 GRAMS
MASS RATIO: 0.576

F69

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUTRAL
NO.CORE SEGMENTS: 1
BURN DURATION: 1.19 SEC.
THRUST-AVERAGE: 15.5 LBS.
THRUST-INITIAL: 13 LBS.
THRUST-MAXIMUM: 19.9 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 4 3/4'
WEIGHT TOTAL: 96.8 GRAMS
WEIGHT BURNOUT: 60.9 GRAMS
MASS RATIO: 0.629

F107

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1
BURN DURATION: 0.77 SEC.
THRUST-AVERAGE: 24 LBS.
THRUST-INITIAL: 31 LBS.
THRUST-MAXIMUM: 31 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 4 1/2'
WEIGHT TOTAL: 83.7 GRAMS
WEIGHT BURNOUT: 59.0 GRAMS
MASS RATIO: 0.705



CLASS 'C' MOTORS

120 N/S
29 MM

THE MIX 'N' MAX MOTOR SERIES

G54

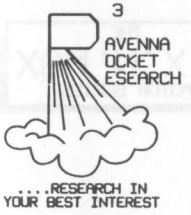
GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1 1/2
BURN DURATION: 2.18 SEC.
THRUST-AVERAGE: 12.1 LBS.
THRUST-INITIAL: 24.9 LBS.
THRUST-MAXIMUM: 28.3 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 5 3/4'
WEIGHT TOTAL: 120 GRAMS
WEIGHT BURNOUT: 61.5 GRAMS
MASS RATIO: 0.513

G100

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUTRAL
NO.CORE SEGMENTS: 1 1/2
BURN DURATION: 1.19 SEC.
THRUST-AVERAGE: 22.5 LBS.
THRUST-INITIAL: 23.9 LBS.
THRUST-MAXIMUM: 28.6 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 5 3/4'
WEIGHT TOTAL: 115.4 GRAMS
WEIGHT BURNOUT: 64.0 GRAMS
MASS RATIO: 0.555

G161

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 1 1/2
BURN DURATION: 0.74 SEC.
THRUST-AVERAGE: 36.2 LBS.
THRUST-INITIAL: 48.4 LBS.
THRUST-MAXIMUM: 48.4 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 5'LG
WEIGHT TOTAL: 92.5 GRAMS
WEIGHT BURNOUT: 60.4 GRAMS
MASS RATIO: 0.653



CLASS 'C' MOTORS

160 N/S
29 MM

THE MIX 'N' MAX MOTOR SERIES

G72

GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 2
BURN DURATION: 2.18 SEC.
THRUST-AVERAGE: 16.2 LBS.
THRUST-INITIAL: 30 LBS.
THRUST-MAXIMUM: 36.3 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 6 3/4'
WEIGHT TOTAL: 141.2 GRAMS
WEIGHT BURNOUT: 67.0 GRAMS
MASS RATIO: 0.474

G130

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUTRAL
NO.CORE SEGMENTS: 2
BURN DURATION: 1.19 SEC.
THRUST-AVERAGE: 29.2 LBS.
THRUST-INITIAL: 25 LBS.
THRUST-MAXIMUM: 37.9 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 6 3/4'
WEIGHT TOTAL: 136.5 GRAMS
WEIGHT BURNOUT: 69.3 GRAMS
MASS RATIO: 0.508

G208

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 2
BURN DURATION: 0.74 SEC.
THRUST-AVERAGE: 46.7 LBS.
THRUST-INITIAL: 60.9 LBS.
THRUST-MAXIMUM: 60.9 LBS.
TIME DELAYS: 0,8,11 SEC.
SIZE: 1 1/8'OD X 6 1/4'
WEIGHT TOTAL: 127.4 GRAMS
WEIGHT BURNOUT: 64.5 GRAMS
MASS RATIO: 0.506

CLASS 'B' MOTORS

200 N/S
29 MM

THE MIX 'N' MAX MOTOR SERIES

H89

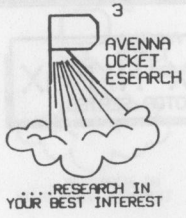
GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 2 1/2
BURN DURATION: 2.18 SEC.
THRUST-AVERAGE: 20 LBS.
THRUST-INITIAL: 39 LBS.
THRUST-MAXIMUM: 46 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 7 3/4"
WEIGHT TOTAL: 163.4 GRAMS
WEIGHT BURNOUT: 73.6 GRAMS
MASS RATIO: 0.450

H168

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUTRAL
NO.CORE SEGMENTS: 2 1/2
BURN DURATION: 1.19 SEC.
THRUST-AVERAGE: 37.8 LBS.
THRUST-INITIAL: 36.8 LBS.
THRUST-MAXIMUM: 48.5 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 7 3/4"
WEIGHT TOTAL: 158.7 GRAMS
WEIGHT BURNOUT: 75.9 GRAMS
MASS RATIO: 0.478

H260

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 2 1/2
BURN DURATION: 0.77 SEC.
THRUST-AVERAGE: 58.4 LBS.
THRUST-INITIAL: 76 LBS.
THRUST-MAXIMUM: 76 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 7 1/4"
WEIGHT TOTAL: 149 GRAMS
WEIGHT BURNOUT: 72.2 GRAMS
MASS RATIO: 0.485



CLASS 'B' MOTORS

240 N/S
29 MM

THE MIX 'N' MAX MOTOR SERIES

H107

GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 3
BURN DURATION: 2.18 SEC.
THRUST-AVERAGE: 24 LBS.
THRUST-INITIAL: 44 LBS.
THRUST-MAXIMUM: 54 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 8 3/4"
WEIGHT TOTAL: 183.8 GRAMS
WEIGHT BURNOUT: 78.3 GRAMS
MASS RATIO: 0.426

H198

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUTRAL
NO.CORE SEGMENTS: 3
BURN DURATION: 1.19 SEC.
THRUST-AVERAGE: 44.5 LBS.
THRUST-INITIAL: 38 LBS.
THRUST-MAXIMUM: 57.9 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 8 3/4"
WEIGHT TOTAL: 179.2 GRAMS
WEIGHT BURNOUT: 80.8 GRAMS
MASS RATIO: 0.451

H312

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 3
BURN DURATION: 0.76 SEC.
THRUST-AVERAGE: 70.1 LBS.
THRUST-INITIAL: 91.7 LBS.
THRUST-MAXIMUM: 91.7 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 8 1/2"
WEIGHT TOTAL: 170.2 GRAMS
WEIGHT BURNOUT: 78.4 GRAMS
MASS RATIO: 0.461

CLASS 'B' MOTORS

320 N/S
29 MM

THE MIX 'N' MAX MOTOR SERIES

H146

GRAIN TYPE: MOONBURNER
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 4
BURN DURATION: 2.18 SEC.
THRUST-AVERAGE: 32.8 LBS.
THRUST-INITIAL: 60 LBS.
THRUST-MAXIMUM: 73 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 10 3/4"
WEIGHT TOTAL: 221.8 GRAMS
WEIGHT BURNOUT: 85.1 GRAMS
MASS RATIO: 0.384

H268

GRAIN TYPE: CENTERBURNER
CHARACTERISTIC: NEUTRAL
NO.CORE SEGMENTS: 4
BURN DURATION: 1.19 SEC.
THRUST-AVERAGE: 60.2 LBS.
THRUST-INITIAL: 52.5 LBS.
THRUST-MAXIMUM: 78 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 10 3/4"
WEIGHT TOTAL: 217.1 GRAMS
WEIGHT BURNOUT: 87.4 GRAMS
MASS RATIO: 0.403

H416

GRAIN TYPE: ALL SURF.BURN
CHARACTERISTIC: REGRESSIVE
NO.CORE SEGMENTS: 4
BURN DURATION: 0.77 SEC.
THRUST-AVERAGE: 93.5 LBS.
THRUST-INITIAL: 121 LBS.
THRUST-MAXIMUM: 121 LBS.
TIME DELAYS: 0,11,14 SEC.
SIZE: 1 1/8"OD X 9.5"
WEIGHT TOTAL: 41.3 GRAMS
WEIGHT BURNOUT: 32.0 GRAMS
MASS RATIO: 0.775

THIS SPACE, AND THE INFINITE CONTINUATION THEREOF, IS RESERVED FOR THE FUTURE POSSIBILITIES OF RAVENNA ROCKET RESEARCH.

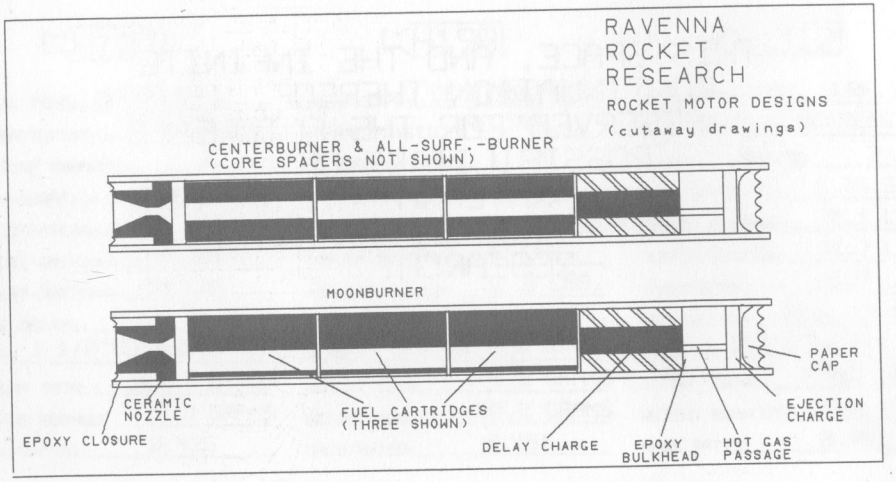
CHOOSING YOUR MOTOR(S)....

WHILE 33 MOTORS MAY SOUND EXCESSIVE; ACTUALLY THERE ARE JUST THREE MOTOR TYPES TO CHOOSE FROM. THE QUANTITY OF 33 IS THE RESULT OF PROVIDING THREE MOTOR TYPES IN TWO CASE DIAMETERS FOR EIGHT STANDARD NEWTON-SECOND CATEGORIES (20,40,80,120, 160,200,240 AND 320 N/S). THE THREE MOTOR TYPES FOUND IN EACH CLASS ARE THE MOONBURNER, CENTERBURNER AND THE ALL-SURFACE-BURN MOTORS.

THE MOONBURNER GETS IT'S NAME FROM THE GENERAL SHAPE OF A CROSS SECTION OF THE PROPELLANT CHARGE AND ALSO THE GENERAL SHAPE THAT THE FLAME FRONT TAKES AS BURN PROGRESSES OUTWARD FROM THE INITIAL CORE COLUMN. THE SHAPE IS CRESCENT LIKE THAT OF A PARTIAL MOON. BECAUSE THE CENTRAL CORE IS TANGENT TO ONE SIDE OF THE MOTOR CASING FOR IT'S ENTIRE LENGTH, SOME OF THE CORE'S LATERAL SURFACE IS MOTOR CASING INSTEAD OF PROPELLANT. INITIALLY, A SMALL PERCENTAGE OF LATERAL CORE AREA IS CASING AS OPPOSED TO PROPELLANT. AS THE BURN CONTINUES AND THE CRESCENT SHAPE GROWS IN SIZE, THERE IS A MUCH GREATER PERCENTAGE OF CASING AREA VERSUS PROPELLANT LATERAL AREA COMPRISING THE CORE. THIS CONDITION GIVES THE MOONBURNER IT'S REGRESSIVE BURN CHARACTERISTIC AS IS OBVIOUS FROM THE THRUST CURVE. THE REGRESSIVE BURN MOTOR GIVES THE HIGHEST AMOUNT OF THRUST INITIALLY AND GRADUALLY DECREASES IN THRUST. THE ROCKET LEAVES THE PAD IN ONE BIG HURRY AS MAXIMUM THRUST IS GENERATED RIGHT AFTER IGNITION. THE OFFSET CORE OFFERS THE BENEFIT OF A MUCH LONGER DURATION OF BURN. BY HAVING THE CORE AGAINST ONE SIDE OF THE CASING, THE LINEAR DISTANCE TO THE OPPOSITE CASING WALL IS MUCH GREATER THAN IF THE CORE WERE CENTRALLY LOCATED. THE MOONBURNER OFFERS IMPRESSIVE HIGH INITIAL THRUST WITH EQUALLY IMPRESSIVE LONG DURATION OF BURN.

OUR SECOND MOTOR TYPE, THE CENTERBURNER, IS CALLED SUCH BECAUSE THE INTERNAL CORE COLUMN IS CENTRALLY LOCATED IN THE PROPELLANT CHARGE. THE DIAMETER OF THIS CORE COLUMN IS APPROXIMATELY ONE HALF THE DIAMETER OF THE MOTOR CASING I.D.. THIS SIZE CORE LEAVES ABOUT ONE FOURTH THE INSIDE DIAMETER AS THE LINEAR BURNING DISTANCE. IN A TYPICAL 1" I.D. MOTOR, THIS WOULD BE 0.25" OF LINEAR BURN. THERE IS A LARGE INITIAL BURNING SURFACE, AIDED BY OUR NON INHIBITED END CAP SURFACES THAT GROWS SLIGHTLY UNTIL ABOUT MID-BURN. WITH MAXIMUM BURN SURFACE AREA OCCURRING AT MID-BURN AND A SLIGHTLY REDUCED (CONTROLLED) SURFACE AREA FOLLOWING UNTIL BURNOUT, THE BURN CHARACTERISTIC IS NEARLY NEUTRAL. THE NEUTRAL CHARACTERISTIC APPROACHES THE PERFECT IDEAL MOTOR; THAT WHICH WOULD PRODUCE THE MAXIMUM THRUST INITIALLY AND FOR THE ENTIRE DURATION OF BURN. THE IDEAL THRUST CURVE WOULD THEN BE A SQUARE WAVE WITH THE AVERAGE THRUST EQUAL TO THE MAXIMUM. YOU MIGHT HAVE NOTICED THAT OUR CENTERBURNER THRUST CURVES ARE RATHER SQUARE. THIS WAS DELIBERATE THROUGH A CAREFUL BALANCE OF INITIAL VERSUS FINAL BURN AREA. THE CENTERBURNER IS A GOOD "LOAD LIFTER" AND WILL GIVE IMPRESSIVE HIGH SPEED FLIGHTS.

OUR THIRD MOTOR TYPE, IN KEEPING WITH THE TREND OF OURS FOR UNIQUENESS, IS THE MOST EXOTIC OF ALL! THE ALL-SURFACE-BURN MOTOR IS OUR FASTEST BURN AND HIGHEST THRUST DESIGN. THE SEGMENTED PROPELLANT CARTRIDGE ARRAY HAS ABSOLUTELY NO OUTER SURFACES THAT DO NOT BURN. EACH CARTRIDGE BURNS FROM THE INSIDE-OUT, THE OUTSIDE-IN AND FROM THE END-CAP SURFACE INWARD. THE RESULT IS TREMENDOUS THRUST FOR A SHORT TIME. THE 29mm MOTORS BURN FOR ABOUT ONE HALF THE DURATION OF OUR CENTERBURNERS (ABOUT 0.6 SECONDS). EACH "NAKED" (SEX SELLS) FUEL CARTRIDGE IS SUSPENDED IN THE COMBUSTION CHAMBER BY FLAME-PROPAGATING SPACERS THAT CONTRIBUTE TO INSTANT-ON. UPON IGNITION, WITH MAXIMUM THRUST IMMEDIATELY PRODUCED, YOUR ROCKET IS "GONE". THE VERY LOUD "CRACK" ABOUT 0.6 SECONDS INTO YOUR FLIGHT LETS YOU KNOW A TREMENDOUS TIME-STEP OF PRESSURE HAS TAKEN PLACE. THESE MOTORS ARE REAL CROWD PLEASERS. SINCE THERE IS A MUCH GREATER AMOUNT OF FABRICATION TIME ASSOCIATED WITH THESE MOTORS (NO MATTER WHICH CLASS), THEY DO COST MORE-BUT THEY'RE WORTH IT!



PICK UP A 6-PAK OR 12-PAK TODAY!

THE FOLLOWING COMPOSITE MOTOR LISTING CONTAINS 'IN-STOCK-MOTORS':

22mm MOTORS

MOTOR TYPE	TOTAL IMPULSE	GRAIN TYPE	INITIAL THRUST	AVERAGE THRUST	MAXIMUM THRUST	BURN TIME	SIZE	DELAYS	PRICE * EACH	6-PAK	12-PAK
D12	20 N/S	MB	6.9 #	2.7 #	7.4 #	1.65 SEC	7/8 X 3.5'	0,5,8	6.00	32.00	60.00
D24	20 N/S	CB	6.4 #	5.4 #	7.0 #	0.79 SEC	7/8 X 3.5'	0,5,8	6.00	32.00	60.00
D33	20 N/S	ASB	13.8 #	7.4 #	13.8 #	0.56 SEC	7/8 X 3.8'	0,5,8	8.00	43.00	80.00
E23	40 N/S	MB	9.7 #	5.2 #	12.4 #	1.73 SEC	7/8 X 4.5'	0,5,8	7.00	37.00	70.00
E39	40 N/S	CB	6.5 #	8.8 #	12.5 #	1.03 SEC	7/8 X 4.5'	0,5,8	7.00	37.00	70.00
E76	40 N/S	ASB	19.9 #	17 #	19.9 #	0.50 SEC	7/8 X 4.8'	0,5,8	9.00	48.00	90.00
F46	80 N/S	MB	19.2 #	10.3 #	24.9 #	1.73 SEC	7/8 X 6.5'	0,8,11	8.00	43.00	80.00
F78	80 N/S	CB	13 #	17.5 #	25 #	1.04 SEC	7/8 X 6.5'	0,8,11	8.00	43.00	80.00
F152	80 N/S	ASB	50 #	34.1 #	50 #	0.53 SEC	7/8 X 6.8'	0,8,11	10.00	53.00	100.00
G68	120 N/S	MB	30 #	15.3 #	37.7 #	1.73 SEC	7/8 X 8.5'	0,8,11	10.00	53.00	100.00
G116	120 N/S	CB	19.8 #	26 #	37.9 #	1.03 SEC	7/8 X 8.5'	0,8,11	10.00	53.00	100.00
G228	120 N/S	ASB	75 #	51.2 #	75 #	0.53 SEC	7/8 X 8.8'	0,8,11	12.00	64.00	120.00

29mm MOTORS

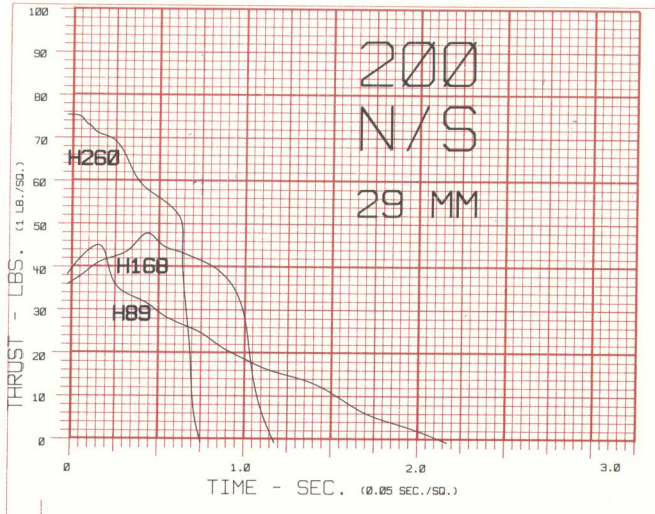
MOTOR TYPE	TOTAL IMPULSE	GRAIN TYPE	INITIAL THRUST	AVERAGE THRUST	MAXIMUM THRUST	BURN TIME	SIZE O.D. X LG.	DELAYS	PRICE * EACH	6-PAK	12-PAK
E19	40 N/S	MB	11.2 #	4.3 #	11.6 #	2.18 SEC	1.13 X 3.8'	0,5,8	7.50	40.00	75.00
E33	40 N/S	CB	11.5 #	7.4 #	11.6 #	1.19 SEC	1.13 X 3.8'	0,5,8	7.50	40.00	75.00
E67	40 N/S	ASB	24.8 #	15 #	24.8 #	0.59 SEC	1.13 X 4.0'	0,5,8	9.50	51.00	95.00
F35	80 N/S	MB	14.5 #	7.9 #	17.7 #	2.18 SEC	1.13 X 4.8'	0,8,11	9.00	48.00	90.00
F69	80 N/S	CB	13 #	15.5 #	19.9 #	1.19 SEC	1.13 X 4.8'	0,8,11	9.00	48.00	90.00
F107	80 N/S	ASB	31 #	24 #	31 #	0.77 SEC	1.13 X 4.5'	0,8,11	11.00	59.00	110.00
G54	120 N/S	MB	24.9 #	12.1 #	28.3 #	2.18 SEC	1.13 X 5.8'	0,8,11	11.00	59.00	110.00
G100	120 N/S	CB	23.9 #	22.5 #	28.6 #	1.19 SEC	1.13 X 5.8'	0,8,11	11.00	59.00	110.00
G161	120 N/S	ASB	48.4 #	36.2 #	48.4 #	0.74 SEC	1.13 X 5.0'	0,8,11	13.00	69.00	130.00
G72	160 N/S	MB	30 #	16.2 #	36.3 #	2.18 SEC	1.13 X 6.8'	0,8,11	13.00	69.00	130.00
G130	160 N/S	CB	25 #	29.2 #	37.9 #	1.19 SEC	1.13 X 6.8'	0,8,11	13.00	69.00	130.00
G208	160 N/S	ASB	60.9 #	46.7 #	60.9 #	0.74 SEC	1.13 X 6.3'	0,8,11	15.00	80.00	150.00
H89	200 N/S	MB	39 #	20 #	46 #	2.18 SEC	1.13 X 7.8'	0,11,14	16.00	85.00	160.00
H168	200 N/S	CB	36.8 #	37.8 #	48.5 #	1.19 SEC	1.13 X 7.8'	0,11,14	16.00	85.00	160.00
H260	200 N/S	ASB	76 #	58.4 #	76 #	0.77 SEC	1.13 X 7.3'	0,11,14	18.00	96.00	180.00
H107	240 N/S	MB	44 #	24 #	54 #	2.18 SEC	1.13 X 8.8'	0,11,14	18.00	96.00	180.00
H198	240 N/S	CB	38 #	44.5 #	57.9 #	1.19 SEC	1.13 X 8.8'	0,11,14	18.00	96.00	180.00
H312	240 N/S	ASB	91.7 #	70.1 #	91.7 #	0.76 SEC	1.13 X 8.5'	0,11,14	20.00	107.00	200.00
H146	320 N/S	MB	60 #	32.8 #	73 #	2.18 SEC	1.13 X 10.8'	0,11,14	20.00	107.00	200.00
H268	320 N/S	CB	52.5 #	60.2 #	78 #	1.19 SEC	1.13 X 10.8'	0,11,14	20.00	107.00	200.00
HH16	320 N/S	ASB	121 #	93.5 #	121 #	0.77 SEC	1.13 X 9.5'	0,11,14	22.00	117.00	222.00

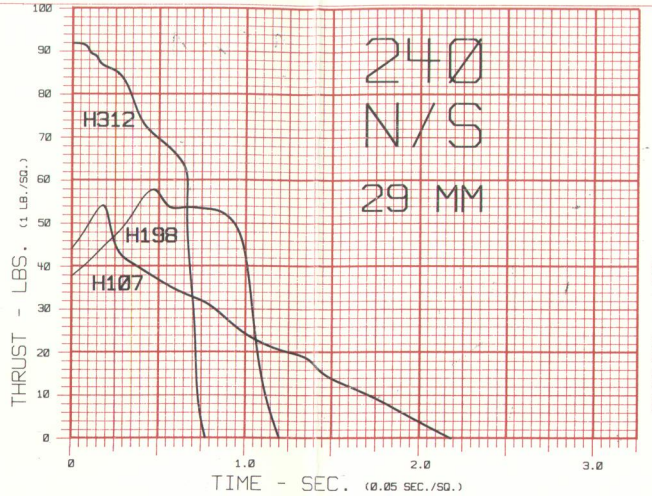
SPECIAL NOTICE

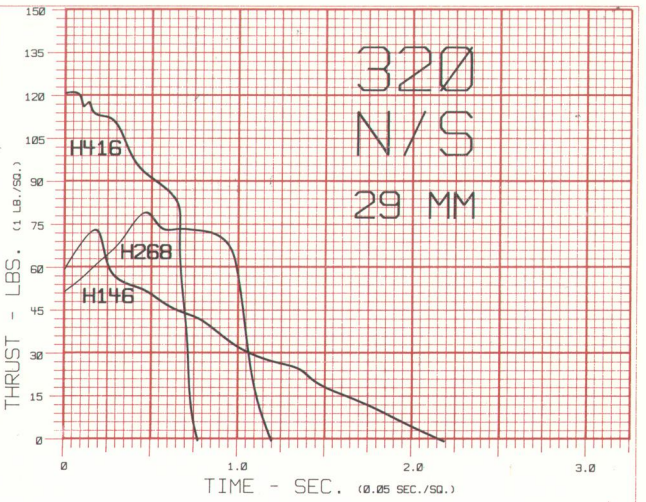
BECAUSE ALL OF OUR MOTORS ARE NOT YET N.A.R. CERTIFIED, PURCHASERS OF CLASS 'C' MOTORS MUST PROVIDE PROOF OF TRIPOLI MEMBERSHIP. CLASS 'B' MOTOR PURCHASERS MUST PROVIDE PROOF OF COMPLIANCE WITH NFPA#1122, OR BE A CONFIRMED CONSUMER WITH THE TRIPOLI ROCKETRY ASSOCIATION, INC.

* LARGE QUANTITY DISCOUNTS ARE AVAILABLE, CONTACT US CONCERNING PURCHASING TERMS.

RAVENNA ROCKET RESEARCH
P.O. BOX 254
RAVENNA, OHIO 44266
PHONE: (216)296-6403







CLASS "B" MOTORS

THE
MIX 'N' MAX
MOTOR SERIES

THE TITLE OF OUR NEW MOTOR SERIES REFERENCES TWO MOTOR CATAGORIES OF CHOICE. THE 'MIX' PORTION REFERS TO THE MIXED CHOICE OF THRUST CHARACTERISTICS THAT WE OFFER IN OUR MOTOR LINE. IT INCLUDES THE PROGRESSIVE-NEUTRAL THRUST CHARACTERISTIC FOUND IN OUR CENTERBURNER AS CONTRASTED BY THE HIGH PEAK INITIAL-FOLLOWED BY REGRESSIVE THRUST CHARACTERISTIC OF OUR MODIFIED MOONBURNER. FUTURE CHOICES IN THIS CATAGORY ('MIX') WILL INCLUDE UNIQUE THRUST CURVE PROFILES MADE POSSIBLE BY FUEL SEGMENTATION, THE MIX OF FUEL CARTIDGE TYPES IN THE TOTAL FUEL CARTIDGE ARRAY AND THE COMPUTER MODELING PROCESS USED IN THEIR DESIGN PROCESS. THE FUTURE WILL BE VERY BRIGHT FOR US IN THIS AREA; WATCH FOR FUTURE UNVAILINGS.

THE 'MAX' PORTION OF OUR MOTOR SERIES TITLE REFERS TO A 'DIFFERENT BREED'. MOTORS CREATED WITH THE SOLE DESIGN PURPOSE OF EXTRACTING THE MAXIMUM THRUST FOR A GIVEN PROPELLANT WEIGHT. OUR CURRENT OFFERING IS A SUSPENDED FUEL CARTRIDGE ARRAY, ALL - SURFACE BURN MOTOR. MULTIPLE FUEL CARTRIDGES COMPLETELY DEVOID OF INHIBITORS, EACH SUSPENDED BY FLAME PROPAGATING SPACERS, CONTAIN ABSOLUTELY NO OUTSIDE SURFACE AREA THAT DOES NOT BURN. THE FUEL CARTRIDGE BURNS FROM THE INSIDE-OUT, THE OUTSIDE-IN AND FORM EACH CARTRIDGE'S END CAPS. THE RESULT IS 'INSTANT-ON'. THESE MOTORS RE-DEFINE ACCELERATION! AS YOU CAN SEE FROM THE THRUST CURVES; A GREAT AMOUNT OF ENERGY IS AVAILABLE FOR ABOUT ONE HALF THE BURN DURATION OF OUR CENTERBURNER.

ALL THREE MOTOR TYPES IN EACH CLASS, WERE COMPUTER MODELED TO EXTRACT THE HIGHEST NEWTON SECOND RATING IN EACH CLASS PER GIVEN DESIGN. THESE MOTORS WERE DESIGNED TO BE UNBEATABLE OR AT THE VERY BEST; ONLY EQUALLED. NEW ALTITUDE RECORDS ARE EXPECTED AS MOTORS ARE CLASS LEGAL MAXIMUMS-NOT PROPELLANT OR TUBING LENGTH SAVING COMPROMISED DESIGNS.

ALL MOTORS FEATURE THE FOLLOWING:

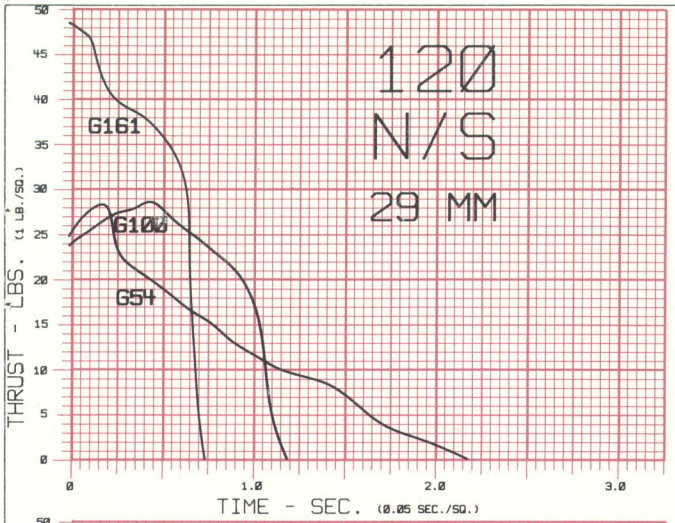
* - FABRIC BASED (NOT PAPER) PHENOLIC TUBING.
* - KILN-FIRED MOLDED CERAMIC REFRACTORY NOZZLES WITH FULL CASE DIAMETER SEALING AND ALIGNMENT.
* - HIGH ENERGY BUTADIENE-BASED COMPOSITE PROPELLANT.
* - FUEL SEGMENTATION, USING STANDARD (PER CASE DIAM.) PRECISION MACHINED FUEL CARTRIDGES WHICH, BY VIRTUE OF ADDITIONAL END CAP BURNING AREA, PROVIDES A FATTER THRUST CURVE WITH A MUCH-NEEDED HIGHER INITIAL THRUST.
* - FOUR DELAY CHARGE CHOICES: 0,5,8 & 11 SEC.
* - EACH MOTOR SUPPLIED WITH THERMALITE IGNITOR.
* - OUR GUARANTEE OF PERFORMANCE AND RELIABILITY.

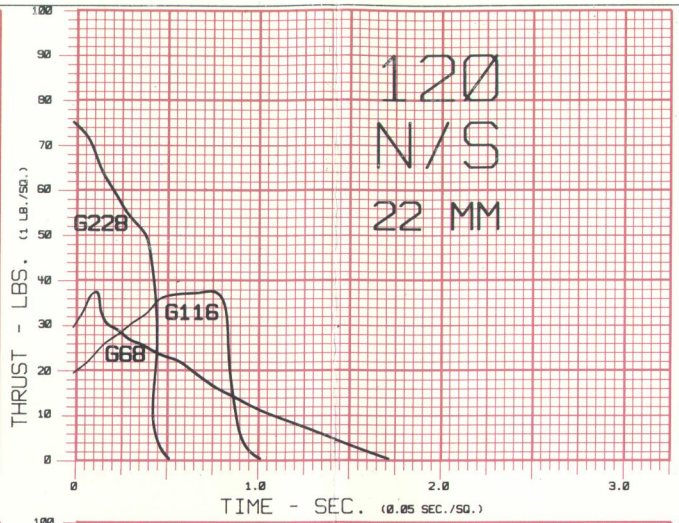
3
RAVENNA ROCKET RESEARCH
P.O. BOX 254
RAVENNA, OHIO
44266
PHONE:(216)296-8403

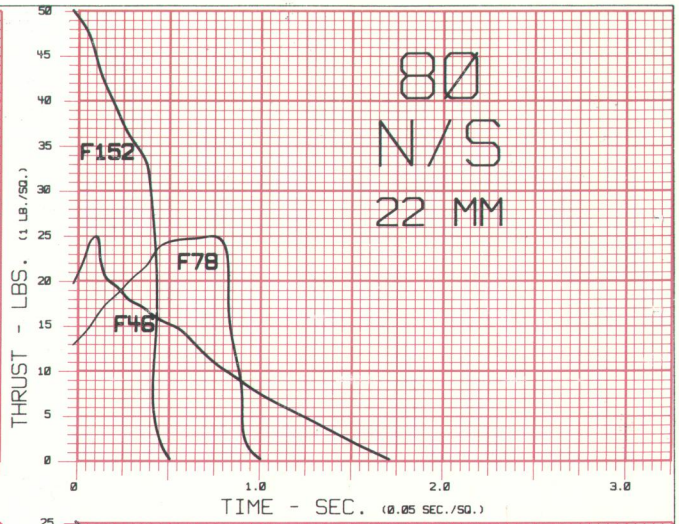
CLASS 'C' MOTORS (22mm)		
MOON BURNER	CENTER BURNER	ALL SURFACE BURNER
D12	D24	D33
E23	E39	E76
F46	F78	F152
G68	G116	G228

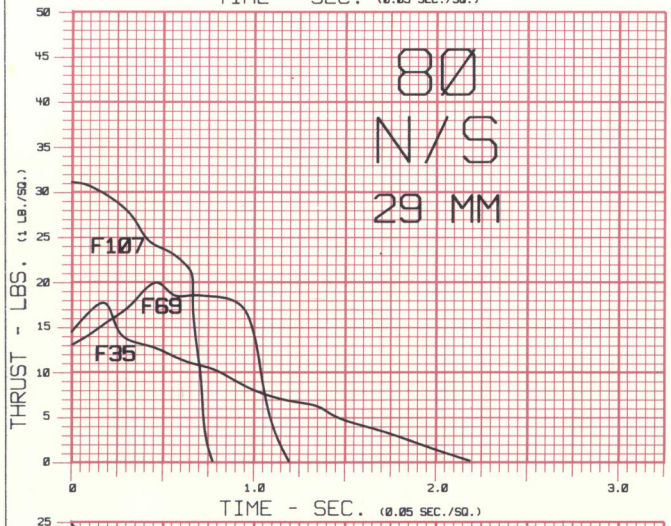
CLASS 'C' MOTORS (29mm)		
MOON BURNER	CENTER BURNER	ALL SURFACE BURNER
E19	E33	E67
F35	F69	F107
G54	G100	G161
G72	G130	G208

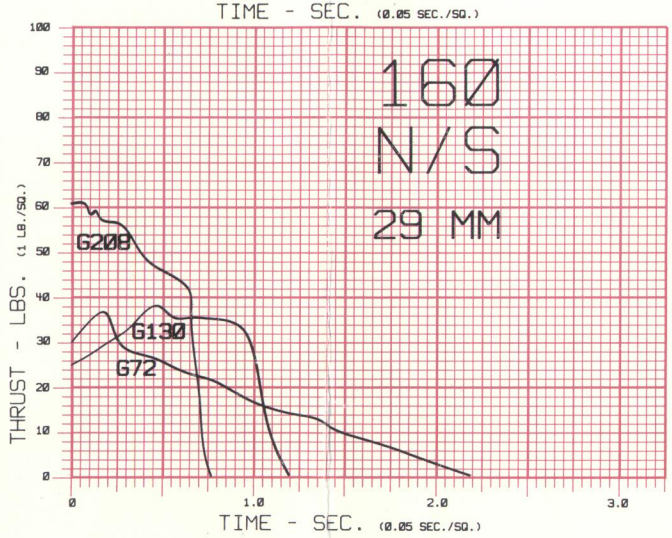
CLASS 'B' MOTORS (29mm)		
MOON BURNER	CENTER BURNER	ALL SURFACE BURNER
H89	H168	H260
H107	H198	H312
H146	H268	H416

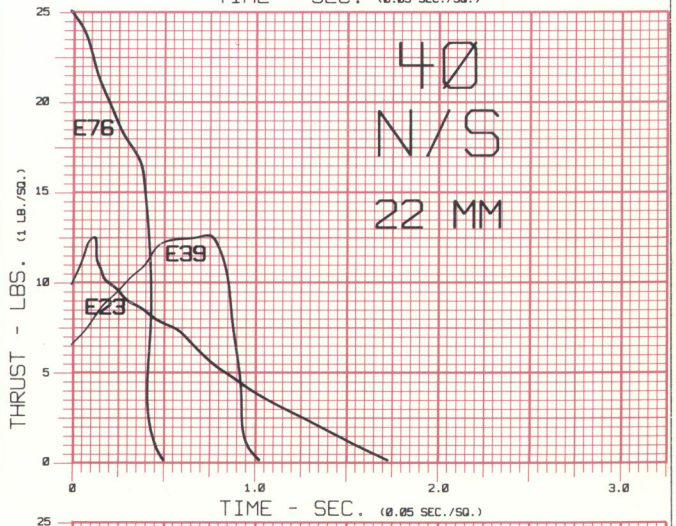


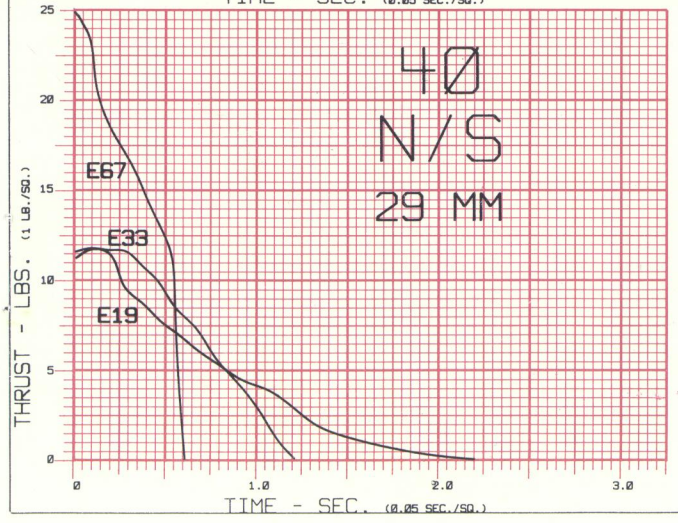










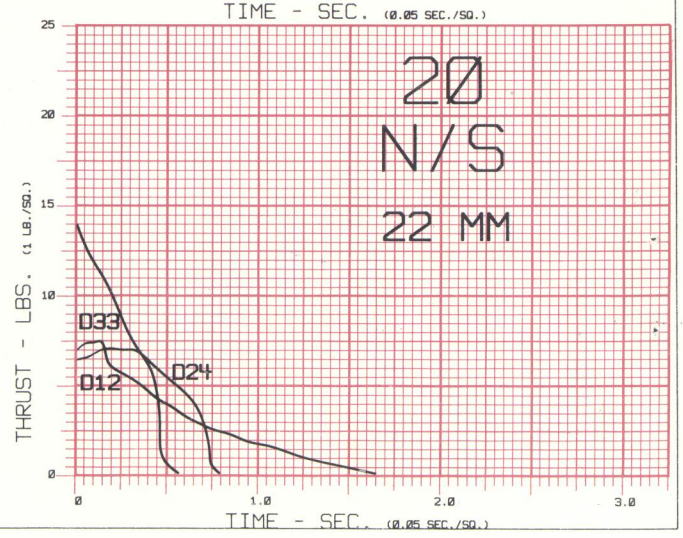


CLASS "C"
MOTORS
DESIGNED BY

RAVENNA
ROCKET
RESEARCH

P.O. BOX 254
RAVENNA, OHIO
44266

PHONE: (216) 296-8403



INITIALLY RAVENNA ROCKET RESEARCH WILL ONLY DEAL DIRECT-FROM-FACTORY. THIS OF COURSE MEANING NO SPECIAL DEALER TERMS OR PRICING DISCOUNTS. INSTEAD, WE HAVE OFFERED A "6-PACK" OR "12-PACK" QUANTITY DISCOUNT THAT IS STRUCTURED NOT ONLY FOR QUANTITY COST SAVINGS, BUT ALSO GREATER PERCENTAGE OF SAVINGS AS YOUR MOTOR SIZE INCREASES. YOU MAY MIX DELAY TIMES AND MOTORS PRICED-THE-SAME IN "PACK" ORDERS.

ALL ORDERS OF UP TO $600.00 AND SMALLER WILL BE PROCESSED WITHIN TWO WEEKS OF RECEIVING FULL PAYMENT VIA CERTIFIED CHECK OR MONEY ORDER. IF THE CUSTOMER CHOOSES TO USE A PERSONAL CHECK, A MANDATORY WAIT ON CHECK/BANK CLEARANCE WILL DELAY THE ORDER, AWAITING CLEARANCE, BY AS MUCH AS TWO ADDITIONAL WEEKS. ORDERS LARGER THAN $600.00 NEED TO BE LEAD-TIME PRE-ARRANGED SO THAT NO PROMISES ARE MADE THAT WE CAN'T KEEP. OUR MINIMUM ORDER IS $15.00 (BEFORE HANDLING, TAX OR SHIPPING CHARGES ARE ADDED IN).

UPON SELECTING YOUR MOTORS, BE SURE TO SPECIFY ONE OF THREE OFFERED DELAY TIME CHOICES. THIS IS ACCOMPLISHED BY ADDING A "-XX" TO THE MOTOR TYPE WHERE "XX" IS THE TIME SELECTION, ONE OF THREE, IN SECONDS OF DELAY. AN EXAMPLE OF AN EIGHT SECOND DELAY ON A 672 WOULD BE 672-8. THIS FULL MOTOR TYPE AND DELAY SPECIFICATION IS PLACED IN THE "MOTOR" COLUMN OF THE ORDER FORM.

SHIPPING COSTS

ALL CLASS "C" MOTORS WILL SHIP DIRECT FROM RAVENNA ROCKET RESEARCH VIA PARCEL POST OR U.P.S DETERMINED BY THE WEIGHT AND DESTINATION OF THE ORDER. TO FIGURE YOUR SHIPPING COST FOR CLASS "C" ONLY:

- FOR ORDERS TOTALING $15.00 TO $34.99 ADD $3.00
- FOR ORDERS TOTALING $35.00 TO $59.99 ADD $5.00
- FOR ORDERS TOTALING $60.00 TO $99.99 ADD $7.00
- FOR ORDERS TOTALING $100.00 TO $149.99 ADD $8.00
- FOR ORDERS TOTALING $150.00 AND UP ADD 6%

CLASS "B" MOTORS AND ORDERS CONTAINING A MIX OF CLASS "C" AND CLASS "B" MOTORS ARE EXPENSIVE-TO-SHIP. THE FOLLOWING SHIPPING COSTS FOR ANY CLASS "B" MOTORS APPLY:

- FOR ORDERS TOTALING $15.00 TO $99.99 ADD $35.00 *
- FOR ORDERS TOTALING $100.00 TO $199.99 ADD $45.00 *
- FOR ORDERS TOTALING $200.00 TO $299.00 ADD $55.00 *
- FOR ORDERS TOTALING $300.00 TO $499.99 ADD $65.00 *
- FOR ORDERS TOTALING $500.00 AND UP ADD 13 % *

*- UNUSED AMOUNT OF CLASS "B" SHIPMENTS WILL BE REFUNDED UPON SHIPMENT.

TERMS AND CONDITIONS

PURCHASERS OF CLASS "B" MOTORS MUST BE "CONFIRMED TRIPOLI MEMBERS" OR MUST PROVIDE PROOF OF COMPLIANCE WITH N.F.P.A.-1122 SATISFYING AT LEAST ONE OF THE FOLLOWING REQUIREMENTS:

1.) "AFFILIATED WITH A LOCAL, STATE OR FEDERAL GOVERNMENT". 2.) "AFFILIATED WITH A COLLEGE OR UNIVERSITY".
3.) "INVOLVED IN A BUSINESS THAT SELLS, TESTS OR PERFORMS RESEARCH WITH ROCKETS".

PURCHASERS OF CLASS "C" MOTORS, NOT MARKED "N.A.R. CERTIFIED", MUST ALSO PROVIDE PROOF OF COMPLIANCE WITH N.F.P.A.-1122 OR BE A MEMBER OF THE TRIPOLI ROCKET SOCIETY. THE ONLY POSSIBLE "CONDITIONAL WAIVER" IS IF THE PURCHASER DOES SUBMIT MEMBERSHIP APPLICATION; VERIFIABLE PRIOR TO SHIPMENT OF PURCHASERS ORDER.

WE AT RAVENNA ROCKET RESEARCH GUARANTEE THAT WE HAVE UTILIZED REASONABLE CARE IN THE DESIGN AND FABRICATION OF OUR PRODUCTS. NO WARRANTY IS EITHER EXPRESSED OR IMPLIED BY RAVENNA ROCKET RESEARCH REGARDING THEIR PRODUCTS OTHER THAN THE REPLACEMENT OF THOSE PRODUCTS WHICH ARE PROVEN DEFECTIVE DUE TO MANUFACTURE. RAVENNA ROCKET RESEARCH RESERVES THE RIGHT TO MODIFY EXISTING PRODUCT DESIGNS, AS DEEMED NECESSARY FOR IMPROVEMENT, WITHOUT SERVING NOTICE. RAVENNA ROCKET RESEARCH SHALL NOT BE HELD RESPONSIBLE FOR ANY PERSONAL INJURY OR PROPERTY DAMAGE RESULTING FROM THE STORAGE, HANDLING OR USE OF OUR PRODUCTS. SINCE THE STORAGE, HANDLING AND USAGE OF OUR PRODUCTS, ONCE SOLD, ARE NOT WITHIN OUR CONTROL. THE BUYER ASSUMES ANY AND ALL RISKS AND LIABILITY RESULTING FROM THE STORAGE, HANDLING OR USAGE OF RAVENNA ROCKET RESEARCH PRODUCTS AND BY UNDER-SIGNING ACCEPTS THESE CONDITIONS.

SIGNATURE: _____ TRIPOLI NUMBER: _____

I HAVE FULLY READ AND UNDERSTOOD THE TERMS AND CONDITIONS STATED ABOVE AND BY SIGNING DO AGREE TO THESE TERMS.

THANK YOU FOR YOUR ORDER AND WE WISH YOU ALL THE ENJOYMENT OUR PRODUCTS BRING.

-WAYNE AND KATHY SCHAEFER

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AVENNA
OCKET
ESEARCH

P.O. BOX 254
RAVENNA, OHIO
44266

ORDER FORM

Customers Name: _____

Address: _____

City: _____ State: _____

Zip: _____

Age: ____ Phone: (____) _____

DATE: _____

QTY.	MOTOR	PRICE EACH	6 PACK	12 PACK	TOTAL

*-SEE REVERSE SIDE.

☐ - YES, I'VE SIGNED THE REVERSE SIDE.

SUB-TOTAL	
SHIPPING*	
HANDLING	$2.50
TAX-7% (OHIO RES.)	
TOTAL AMOUNT	

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RAVENNA
ROCKET
RESEARCH

P.O. BOX 254
RAVENNA, OHIO
44266

TO: _____

....RESEARCH IN YOUR BEST INTEREST