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PROGRAM POKAZU

Godz. 10[illegible] Prelekcja o lotnictwie Polskiego Lotnictwa Cywilnego — mgr inż. T. Kasza

Godz. 11[illegible] Pokaz samolotów, śmigłowca i srzbowców na ziemi oraz w locie:

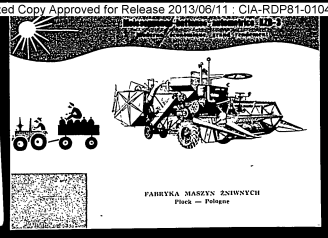
1) Samolot Kanta — 2 — Pilot M. Gołębiowski
2) " Jak — 12 M — " " W. Pelka
3) " Bies — 15-B — " " inż. L. Natkaniec
4) Śmigłowiec SM — 1 — " " inż. R. Wiśniewski
5) Szybowiec Jaskółka — " " inż. R. Sochański
6) " Jaskółka „A" — " " J. Wagner
7) " Bocian — " " F. Gruszkowski
8) " Czapla — " " J. Pomianowski
9) " ABC — " " Z. Rodos
10) " Czaka — " " inż. J. B. Grudzński

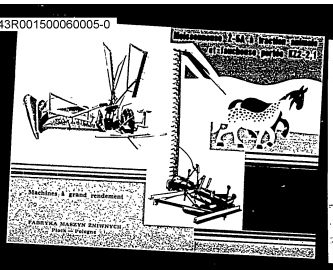
Godz. 12[illegible] Lampka wina oraz luty poczęstunek dla zaproszonych gości na śmigłowcu, samolotach i szybowcach.

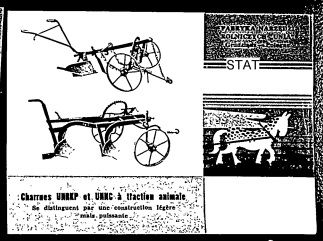
Informacji handlowych udzielą przedstawiciele „Motoimportu"

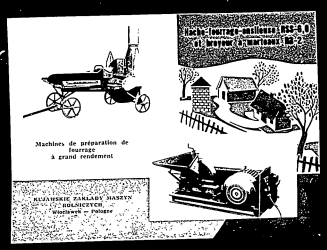
DYREKTOR
CENTRALI HANDLU ZAGRANICZNEGO „MOTOIMPORT"

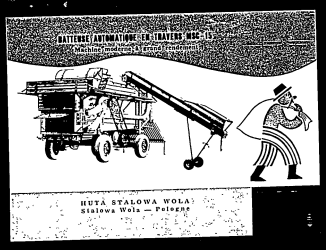
FOKAZ POLSKIEGO CYWILNEGO EKSPORTOWEGO SPRZĘTU LOTNICZEGO
Lotu odbędzie się na lotnisku Gocław w dniu 15.X.1957 roku o godz. 10-tej

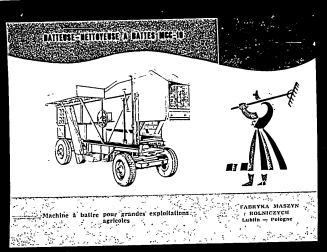


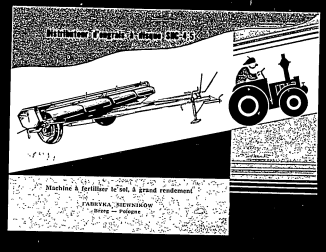


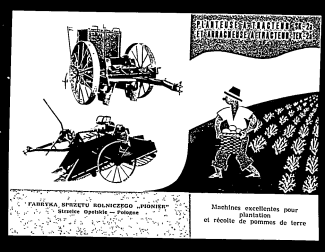


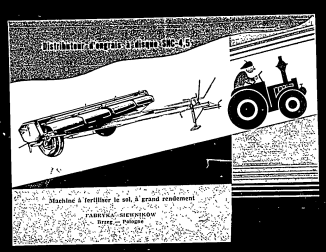


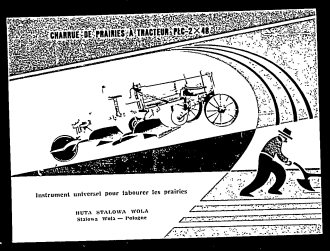


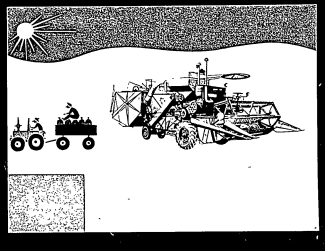


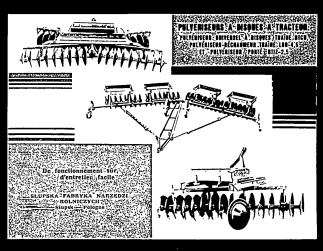












PROGRAM POKAZU

Godz. 1092 Prelekcja i film o osiągnięciach Polskiego Lotnictwa Cywilnego – mgr inż. T. Kopla

Godz. 1102 Pokaz samolotów, śmigłowca i szybowców na ziemi oraz w locie:

1) Samolot Kania – 2 – Płat M. Gołębiowski
2) „ Jak – 12 M – „ W. Pełka
3) „ Bies – 15-B – inż. L. Matuszisz
3) Śmigłowiec SM – 1 – „ R. Wiśniewski
4) Szybowiec Jastrząb – „ K. Sachurski
5) „ Jastrząb „ – „ J. Wiorek
6) „ Bocian – „ A. Gawłowski
7) „ Czapla – „ J. Pomianowski
8) „ ABC – „ Z. Rodos
9) „ Czajka – „ inż. J. Rutkowski
10) „ Czajka wino

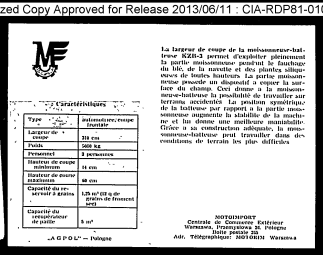
Godz. 1212 Lotnicze wino oraz loty pasażerskie dla zainteresowanych gości na śmigłowcu, samolotach i szybowcach.

Informacji handlowych udzielą przedstawiciele „Motoimportu"

DYREKTOR
CENTRALI HANDLU ZAGRANICZNEGO „MOTOIMPORT"

POKAZ POLSKIEGO CYWILNEGO EKSPORTOWEGO SPRZĘTU LOTNICZEGO

Loty odbędzie się na lotnisku Goclaw w dniu 15.X.1957 roku o godz. 10-tej



La largeur de coupe de la moissonneuse-batteuse KZB-3 permet d'exploiter pleinement la partie moissonnée pendant le fauchage du blé, de la navette et des plantes sibliqueuses de toutes hauteurs. La partie moissonneuse procède un dispositif à couper la surface du champ. Ceci donne à la moissonneuse-batteuse la possibilité de travailler sur terrains accidentés. La position symétrique de la batteuse par rapport à la partie moissonneuse augmente la stabilité de la machine et lui donne une meilleure manisabilité. Grâce à sa construction adéquate, la moissonneuse-batteuse peut travailler dans des conditions de terrain les plus difficiles

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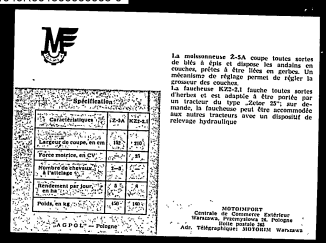
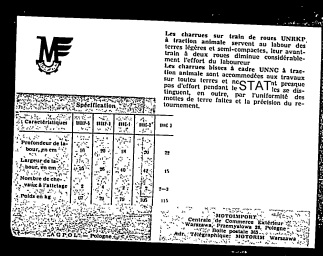
Adr. Télégraphique: MOTORIM Warszawa

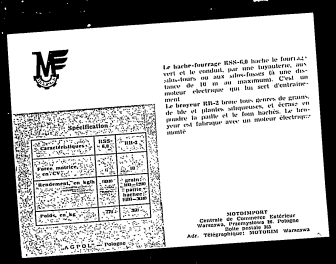
„AGPOL" — Pologne



La moissonneuse 2-5A coupe toutes sortes de blés à épis et dispose les andains en couches, prêtes à être liées en gerbes. Un mécanisme de réglage permet de régler la grosseur des couches.
La faucheuse KZ2-2,1 fauche toutes sortes d'herbes et est adaptée à être portée par un tracteur du type „Zetor 25", automoteur, la faucheuse peut être accommodée aux autres tracteurs avec un dispositif de relevage hydraulique



Les charrues sur trais de roues UNIRO à traction animale servent au labour des terres légères et semi-compactes, leur avantage à deux roues diminue considérablement l'effort du laboureur
Les charrues blaves à cadre UNNC à traction animale sont accommodées aux travaux sur toutes terres et nos pour d'une pendant le S[illegible] ts ar dis tinguent, en outre, par l'uniformité des mottes de terre faites et la précision du retournement.



Le hache-fourrage RSS-0,8 hache le fourrage vert et le malaxe, par une torpédeur, ou chaumes ou aux silos-fosses ils une distance de 10 m et au maximum. C'est un tonte de électrique qui lui sert d'entraînement
Le broyeur KR-2 broie tous genres de grains, de blé et plantes sibliques, et écrase en de blé et plantes sibliques, et écrase en de blé et plantes barbues. Le broyeur est fabriqué avec un moteur électrique monté

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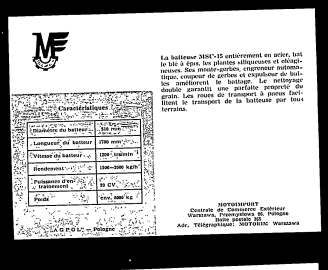

La batteuse MSC-15 entièrement en acier, bat le blé à épis, les plantes sibliqueuses et oléagineuses. Ses monte-gerbes, engreneur automatique, coupeur de gerbes et cribleur de balles améliorent le battage. Le nettoyage double garantit une propreté parfaite du grain. Les roues du transport à pneus facilitent le transport de la batteuse par tous terrains.

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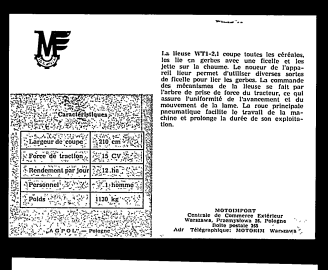

La lieuse WT1-2,1 coupe toutes les céréales, les lie en gerbes avec une ficelle et les jette sur le chaume. Le coupeur de l'appareil lieur permet d'utiliser diverses sortes de ficelle pour lier les gerbes. La commande des mécanismes de la lieuse se fait par l'arbre de prise de force du tracteur, ce qui facilite le travail de l'opérateur et du mécanicien de la lieuse. La lieuse principale pneumatique facilite le travail de la machine et prolonge la durée de son exploitation.

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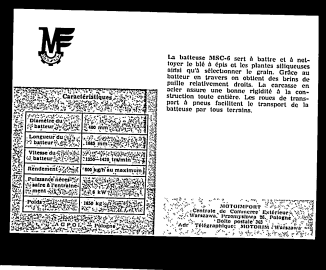

La batteuse MSC-6 sert à battre et à nettoyer le blé à épis et les plantes sibliqueuses ainsi qu'à ensacher le grain. Grâce au batteur on trouvera ou obtient des brins de paille relativement droits. Les trieurs en acier assure une bonne rigidité à construction toute entière. Les roues de transport à pneus facilitent le transport de la batteuse par tous terrains.

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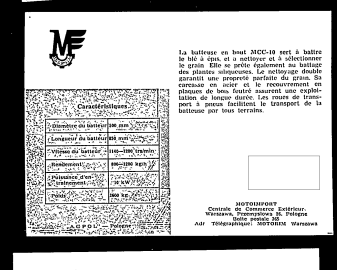

La batteuse en bout MCC-10 sert à battre le blé à épis, et à nettoyer et à sélectionner le grain. Elle se prête également au battage des plantes sibliqueuses. Le nettoyage double garantit une propreté parfaite du grain. Sa carcasse en acier et le recouvrement en plaques de bois, fautré assurent une exploitation de longue durée. Les roues de transport à pneus facilitent le transport de la batteuse par tous terrains.

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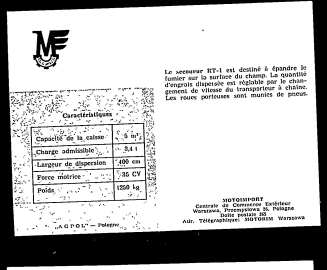

Le semeur RT-1 est destiné à épandre le fumier sur la surface du champ. La quantité d'engrais dispersée est réglable par le changement de vitesse du transporteur à chaîne. Les roues porteuses sont munies de pneus.

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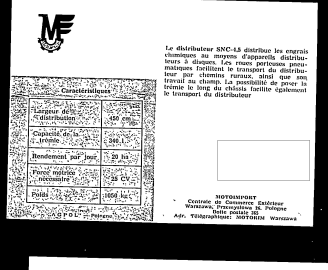

Le distributeur SNC-1,5 distribue les engrais chimiques au moyens d'appareils distributeurs à disques. Les roues porteuses pneumatiques facilitent le transport du distributeur par chemins ruraux, ainsi que son travail au champ. La possibilité de peser le trémie le long du châssis facilite également le transport du distributeur

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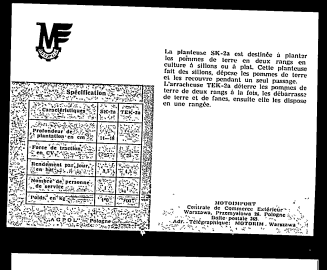

La planteuse SK-2a est destinée à planter les pommes de terre en deux rangs à la fois. Elle fait des sillons, dépose les pommes de terre et les recouvre pendant un seul passage. L'arracheuse TEK-2a détterre les pommes de terre de deux rangs à la fois, les débarrasse de terre et de fanes, ensuite elle les dispose en une rangée.

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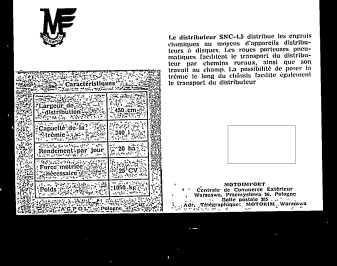

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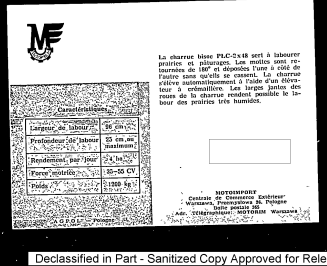

La charrue bisse PLC-2×18 sert à labourer prairies et pâturages. Les mottes sont retournées de 180° et déposées l'une à côté de l'autre sans qu'elle se cassent. La charrue s'élève automatiquement à l'aide d'un élévateur à crémaillère. Les larges jantes des roues de la charrue rendent possible le labour des prairies très humides.

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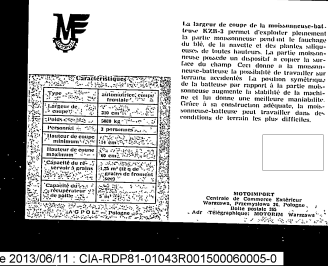

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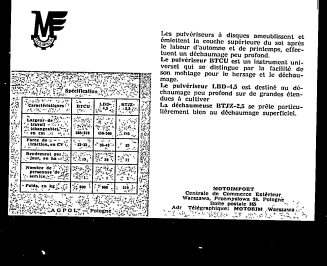

Les pulvériseurs à disques amoublissent et ameublissent la couche supérieure du sol après le labour d'automne et de printemps, effectuent un déchaumage peu profond
Le pulvériseur BTCU est un instrument universel qui se distingue par la facilité de son roulage pour le hersage et le déchaumage
Le pulvériseur LBO-12 est destiné au déchaumage peu profond sur de grandes étendues à cultiver
La déchaumeuse BTJC-2,5 se prête particulièrement bien au déchaumage superficiel.

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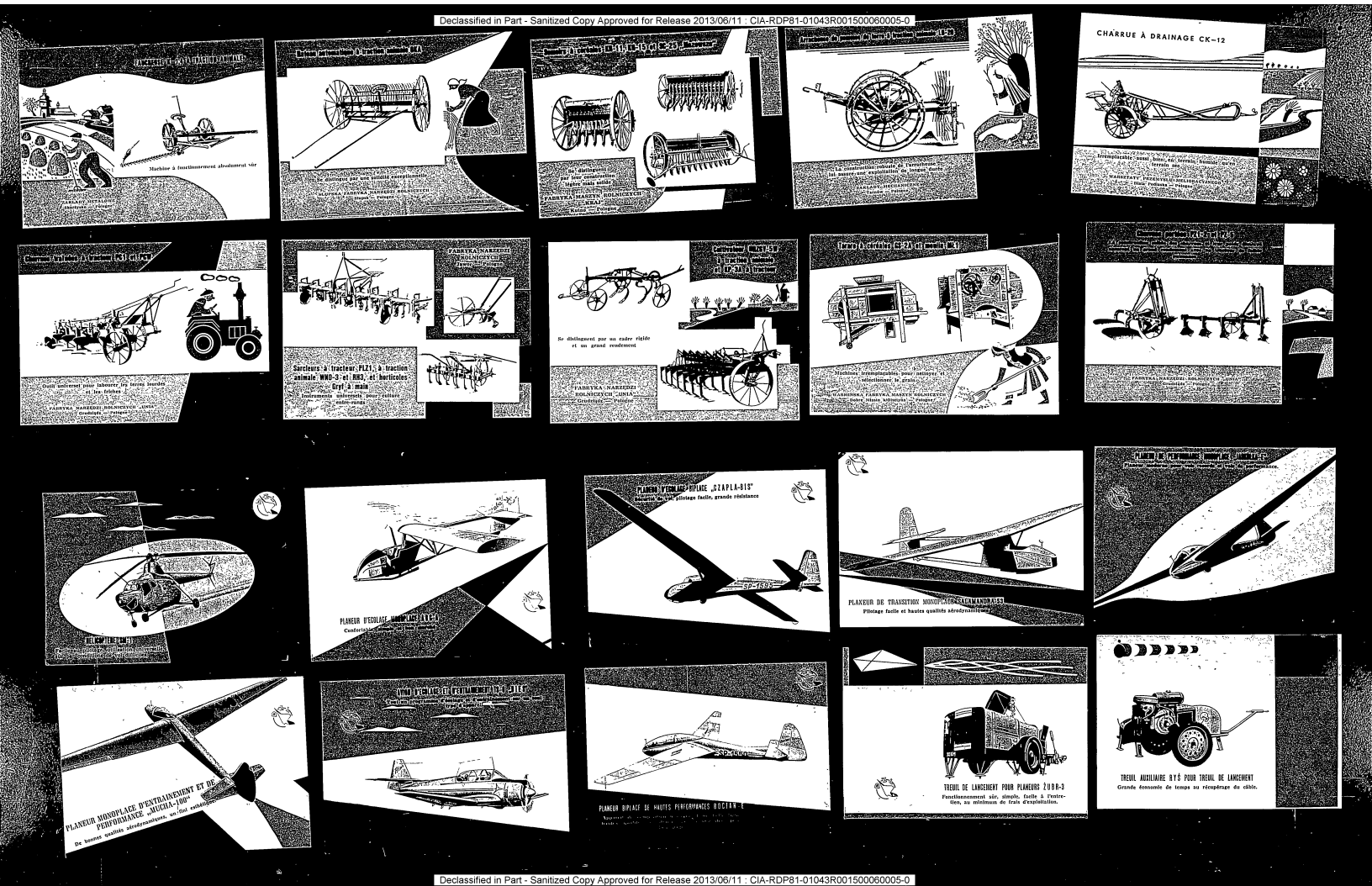

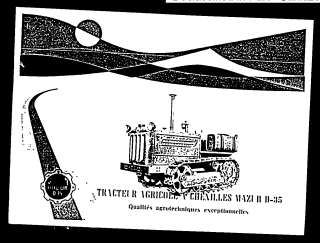

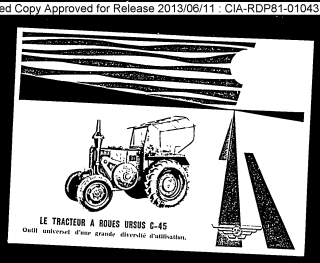

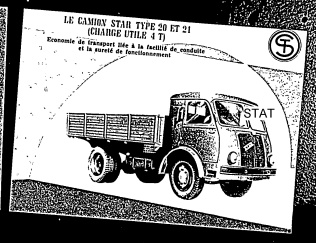

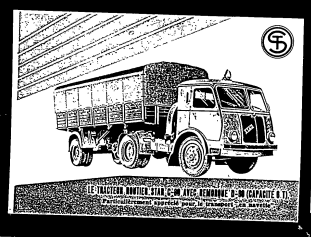

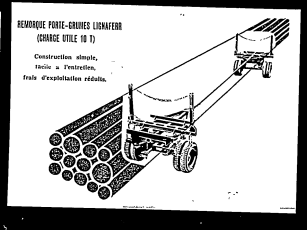

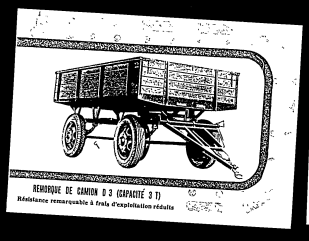

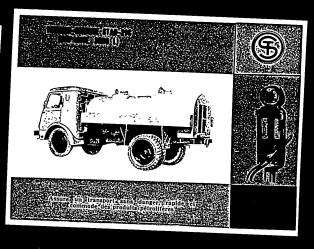

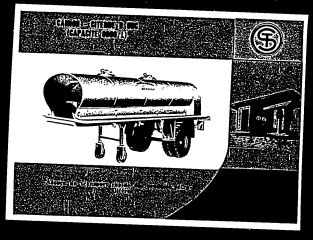

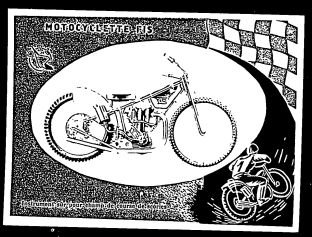

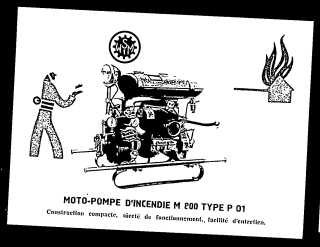

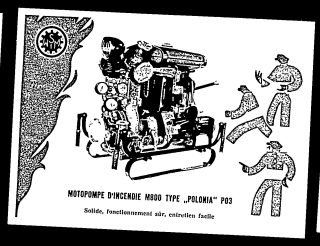

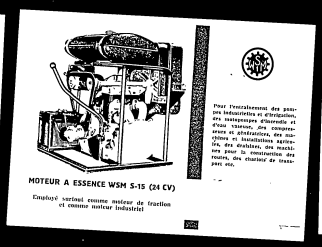

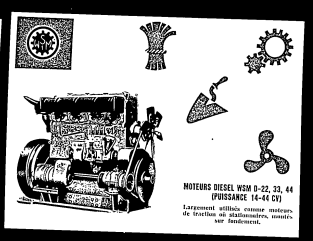

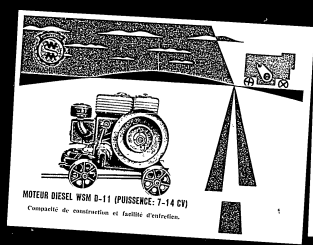

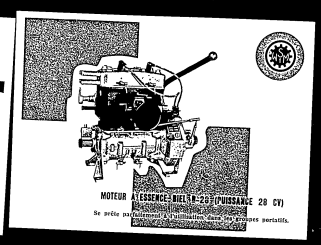

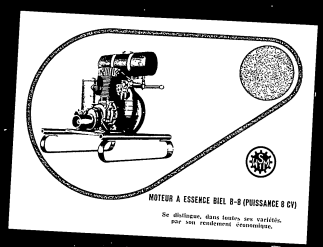

La voiture de livraison „Warszawa Pick-up" se distingue par ses qualités dynamiques, par sa maniabilité, sa bonne visibilité, son amortissement. Grâce à ces avantages la voiture de livraison „Warszawa Pick-up" se prête admirablement au transport de petites charges par les rues des grandes villes et par les routes de la banlieue.
C'est surtout la capacité de rouler sur tous terrains qui mérite l'attention des usagers de la voiture „Warszawa Pick-up" car elle rend possible la livraison de la charge à chaque destination.

Caractéristiques

Type du moteur	4 cylindres, 4 temps, à essence
Cylindrée	2120 cm³
Puissance nominale	54 CV à 3650 tr/min
Cotes d'encombrement:	
longeur	4663 mm
largeur	1695 mm
hauteur	1590 mm
Poids du véhicule	1350 kg

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Le tracteur à chenilles Mazur D-35 est désigné aux grands et moyens labours, semis et binage, ainsi qu'un grand nombre d'autres travaux agricoles. Grâce à une puissance de traction notable, à sa mobilité et facilité d'entretien, le tracteur Mazur D-35 peut être utilisé même dans un terrain très difficile, et très souvent, il est irremplaçable dans les travaux forestiers. Par ailleurs, le tracteur Mazur D-35 montre des qualités exceptionelles à l'utilisation au transport lourd sur petites distances, particulièrement en terrains difficiles. Une autre qualite du tracteur Mazur D-35 est son domaine d'utilisation en tant que moyen de propulsion stationnaire d'installations telles que batteuses, pompes etc. au moyen de la poulie de transmission de force.

Caractéristique technique

Moteur type	Diesel, 4 temps
Nombre et disposition des cylindres	4, verticale, en ligne
Puissance nominale	[illegible] CV
Cylindrée	4,19 l
Taux de compression	17 [illegible]
Dimensions extérieures du tracteur:	
longueur	3000 mm
largeur	1630 mm
hauteur	2190 mm
Garde-au-sol	375 mm
Rayon de virage minimum	1400 mm

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Le tracteur à roues URSUS C-45 est, avant — tout, désigné aux travaux de culture tant sur terres cultivées régulièrement, légères ou difficiles, que sur friches, prairies et autres terres fraîchement cultivées.
Le tracteur URSUS C-45 est également largement utilisé dans le transport lourd, pour la traction de remorques dans un terrain inaccessible aux autres moyens de transport.
La diversité d'utilisation du tracteur URSUS C-45 est encore accrue par la possibilité de son utilisation à la propulsion — à l'aide d'une courroie de transmission de machines stationnaires et installations mobiles telles que batteuses, presses à paille, pompes à eau, génératrices etc., ainsi que pour la possibilité d'utiliser sa poulie d'entraînement à la commande des mécanismes aux machines accouplées, pendant la marche du tracteur.
L'équipement du tracteur URSUS C-45 d'une cabine légère démontable mais également solide, une disposition rationnelle des pédales, leviers de commande, commutateurs et instruments de contrôle, et enfin un siège doux et confortable — assurent au conducteur de bonnes conditions de travail.

Caractéristique technique

Moteur type	monocylindre, deux temps, horizontal, basse compression, à injection	
Alésage/course	225/260 mm	
Cylindrée	10,31 l	
Taux de compression	4,75	
Puissance nominale	45 CV	
Dimensions extérieures du tracteur:	avec cabine	sans cabine
longueur	3300 mm	3300 mm
largeur	1900 mm	1900 mm
hauteur	2530 mm	2360 mm
Puissance de traction maximum au crochet		2900 kg

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La benne basculante STAR W-14 est destinée au transport de différents matériaux de construction et autres tels que décombres, terre, sables, chaux, apprêt de ciment semi-liquide, produits agricoles tels que pommes de terre, betteraves etc., et des matériaux charbonnifères comme charbon, coke etc. Le mécanisme hydraulique de bascule, utilisé dans la benne basculante STAR W-14 assure un déchargement rapide des matériaux transportés.

Les qualités spécifiques que possède la benne basculante STAR W-14 et qui méritent d'être soulignées, sont: mobilité exceptionelle, sûreté de marche en tous terrains et par toutes conditions atmosphériques, résistance de tous les organes, et tout particulièrement du châssis et du système de roulement, économie dans la consommation de combustible et facilité d'entretien.

Caractéristique technique

Moteur type	S 42, 6 cylindres, 4 temps, à essence
Alésage/course	85/108 mm
Cylindrée	4180 cm³
Taux de compression	6,2
Puissance nominale	88 CV à 3000 tr/min
Dimensions intérieures du véhicule:	
longueur	4000 mm
largeur	2070 mm
hauteur	2000 mm
Poids mort de la benne basculante	3830 kg

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Le camion STAR se distingue par une grande vitesse avec un chargement élevé une sûreté de marche en tous terrains et par toutes conditions atmosphérique, une grande résistance de tous les organes et spécialement du châssis, et du système de roulement, une économie dans la consommation de combustible et un entretien facile.

La construction compacte du camion STAR lui confère une grande mobilité avec une parfaite visibilité du conducteur. Cette qualité facilite la conduite du camion dans les conditions de circulation dense, ainsi que sur des routes difficiles et mauvaises.

Le camion STAR est fabriqué en deux modèles:
— comme camion routier STAR-20, avec une boîte à 4 vitesses,
— comme camion tous-terrains, STAR-21, avec une boîte à 5 vitesses.

Caractéristiques

[illegible]

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Le tracteur routier STAR C-60 est le véhicule par excellence pour le transport de materiaux nécessitant beaucoup de temps pour le chargement et le déchargement, et, — grâce à la grande surface de chargement de sa remorque D-60 — au transport de chargements de poids réduit, produits industriels légers, produits agricoles, bétail, charges de grande longueur, etc. Mobilité, vitesse, sûreté de marche — voila les qualités principales par lesquelles le tracteur routier C-60 à acquis une grande réputation parmi ses nombreux usagers.

Le tracteur routier est fabriqué en deux modèles:
— comme tracteur routier avec une boîte à 4 vitesses,
— comme tracteur routier pour routes difficiles, avec une boîte à 5 vitesses.

Caractéristique technique

Moteur type	S 42, 6 cylindres, 4 temps, à essence	
Alésage/course	85/108 mm	
Cylindrée	4180 cm³	
Taux de compression	6,2	
Puissance nominale	88 CV à 3000 tr/min	
Dimensions extérieures	tracteur	remorque
longueur	4615 mm	8000 mm
largeur	2070 mm	2210 mm
hauteur	2300 mm	2700 mm
Poids mort	3100 kg	2600 kg

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La remorque Lignaferr est destinée au transport de grumes, rails et autres charges de cette catégorie, d'une longueur de 6—25 m.
Une robuste construction de la remorque Lignaferr ainsi qu'une bonne suspension à ressorts permettent de l'utiliser même dans des conditions de terrain les plus difficiles.
Les ranches des plateaux porteurs de la remorque Lignaferr empêchent le glissement du chargement pendant le transport.
La sécurité de route de la remorque Lignaferr est assurée par un frein automatique infaillible.
L'équipement de la remorque Lignaferr d'un système bloquant le trian virable en marche arrière augmente sensiblement la mobilité de la remorque.
Un frein à main supplémentaire permet de garer la remorque décrochée du tracteur sur un terrain en pente.
La sécurité du déchargement est assurée par des leviers manoeuvrant les ranches, disposés du côté opposé au déchargement.

Caractéristique technique

Dimensions extérieures de la remorque:	
longueur avec timon	7000 mm
longueur sans timon	5307 mm
largeur	2410 mm
Dimensions entre essieux:	
maximum	13000 mm
minimum	5070 mm
Ecartement des ranches	2010 mm
Poids mort de la remorque	3000 kg

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Les ridelles latérales et arrière du plateau de chargement de la remorque D-3 facilitent le chargement et déchargement du matérial transportable.
Robuste et durable, d'une construction en bois, le plateau à ridelles de la remorque D-3 est renforcé de ferrures façonnées et de chaînes d'attache, assurant la sécurité du chargement transporté.
L'excellente suspension à ressorts de la remorque D-3 assure le chargement transporté contre les chocs.
La sécurité de route de la remorque D-3 est assurée par un frein automatique fonctionnant efficacement.
L'équipement de la remorque D-3 d'un système bloquant le train virable en marche arrière permet au tracteur avec la remorque de sortir d'étroites ruelles en marche arrière. Grâce à l'équipement de la remorque D-3 d'un crochet de remorquage et d'une installation de signalisation appropriée, elle se prête parfaitement aux trains routiers, composés d'un tracteur routier et de plusieurs remorques.

Caractéristique technique

Dimensions extérieures de la remorque:	
longueur avec timon	5270 mm
longueur sans timon	3730 mm
largeur	2300 mm
Dimensions intérieures du plateau de chargement:	
longueur	3645 mm
largeur	2030 mm
hauteur des ridelles	600 mm
Poids mort de la remorque	1250 kg

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La voiture-citerne Star-21C est destinée à fournir des produits pétrolifères aux petits postes d'essence, la Star-21C s'acquitte de sa tâche à merveille grâce à la construction adequate de la citerne et à l'équipement riche en installations servant à remplir et à vider les reservoirs.
La voiture-citerne Star-21C est construite sur la carrosserie du camion Star-21 et, tout comme lui se distingue par une grande vitesse un fonctionnement sur une résistance des tous les ensembles une consommation économique de combustible, un entretien facile.

Caractéristiques

Type du moteur	S 42, 6 cylindres, 4 temps, à essence
Puissance nominale	85 CV à 2800 tr/min
Cotes d'encombrement:	
longueur	5700 mm
largeur	2180 mm
hauteur	2200 mm
Poids de la voiture	3960 kg

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Le camion — citerne D 60C est adapté pour travailler avec le tracteur routier Star C-60; il est destiné à fournir des produits pétrolifères aux postes d'essence. Grâce à sa bonne construction et à son équipement riche en installations servant à remplir et à vider les réservoirs, le camion-citerne D 60C rend de grands services dans le transport des produits pétrolifères et particulièrement dans le transport „en navette".

Caractéristiques

Cotes d'encombrement:	
longueur	6920 mm
largeur	2140 mm
hauteur	2440 mm
Poids du camion	2250 kg

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C'est grâce à la grande puissance de son moteur, aux transmissions bien choisies, ainsi qu'à la construction adéquate, que la motocyclette FIS est devenue un instrument sûr au champ de course de scories.
Le cadre de la motocyclette FIS, à tuyaux est soudé avec des noeuds renforcés. Fourche avant avec amortisseur suspension arrière rigide.
Les roues sont dans des roulements à billes. Embrayage à disques.

Caractéristiques

Type du moteur	4 temps, à essence
Alésage/course	80/99 mm
Taux de compression	14,5
Combustible	Méthanol
Puissance	45 CV à 6000 tr/min
Cotes d'encombrement:	
longueur	2030 mm
hauteur	1140 mm
largeur (avec volant)	800 mm
Poids	97 kg

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La moto-pompe M 800 type P01 se compose d'un moteur à essence et d'une pompe à incendie, formant un ensemble monté sur un châssis commun, équipé de patins pour pouvoir être traînée et de timons glissables, pour le transport par 2 personnes.
Grâce à une durabilité remarquable, un démarrage facile, un fonctionnement sûr, une adaptation au transport à bras où automobile aisée et, avant tout, à la facilité d'entretien, la moto-pompe M 800 type P01 jouit d'une grande renommée parmi ses nombreux usagers.
Elle est particulièrement estimée comme matérial principal à incendie par les sapeurs-pompiers.

Caractéristique technique

Moteur type	BIEL B-28, 2 cylindres, à essence
Puissance caractéristique	28CV à 3000 tr/min
Alésage/course	96 × 76 mm
Cylindrée	1103 cm³
Taux de compression	6,1
Pompe type	P01, centrifuge, 2 étages
Poids de la moto-pompe	140 kg
Dimensions extérieures de la moto-pompe:	
longueur (timons sortis)	975 mm
largeur	560 mm
hauteur	850 mm
Débit normal de la moto-pompe à une hauteur d'élévation manométrique de 80 m et une hauteur d'aspiration de 1,5 m	800 l/min
Débit à écoulement libre, au minimum	1200 l/min

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La motopompe M800 type „Polonia" P03 est irremplaçable en tant que matériel d'extinction aussi bien pour les corps des sapeurs-pompiers que pour les organisations des pompiers volontaires. On fait aussi intervenir cette motopompe dans les actions contre l'innondation; elle s'y prête très bien, étant donné sa possibilité de fonctionner des dizaines d'heures sans interruption.
C'est surtout les avantages suivants qu'il convient de mettre en relief: mise en marche rapide du moteur de la motopompe, elle est pourvue d'un appareil d'aspiration et d'un dispositif servant à dégivrer la pompe, elle subit un refroidissement indirect par eau. Sur demande la motopompe est livrée munie d'une installation électrique de démarrage et d'éclairage; elle porte alors le symbole M800E.

Caractéristiques

Rendement de la motopompe	Maximum	Normal	Diminué	A grande hauteur d'aspiration	A soupapes fermées
l/min	1200	800	400	400	[illegible]
Hauteur manométrique de refoulement de la colonne d'eau, en m	[illegible]	80	125	60	130
Hauteur géométrique d'aspiration, en m	1,5	1,5	1,5	7,5	[illegible]

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Le moteur d'automobile S-15 est le principal du groupe les autres sont des moteurs industriels de dérivation (montes sur cadre avec réfrigérant et réservoir à combustible comme ensembles complets d'entraînement). Les voici
a. type S-15C avec embrayage fixe·
b. type S-15CT avec embrayage débrayable en marche
c. type S-15PT avec embrayage débrayable en marche et avec réducteur de tours
d. type S-15M avec embrayage débrayable en marche, accommode à actionner les motopompes d'incendie ou industrielles;
e. type S-15MS construit comme le S-15M avec éjecteur

Caractéristiques

Type du moteur	2 temps, 2 cylindres, à essence
Cylindrée	744 cm³
Allumage	à étincelles
Refroidissement	par eau, à thermo-siphon

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Du fait de leur simplicité de construction et facilité d'entretien, et, avant tout, de la sûreté de leur fonctionnement, les moteurs WSM D-22,33,44 sont utilisés avec succès dans l'agriculture, industrie, construction, et à la propulsion d'installations et machines telles que: groupes électrogènes, compresseurs, pompes à eau et à boue, installations laitières, cylindreuses, excavatrices, bétonneuses, granuleuses, mélangeurs, tourbeuses, demoiselles, monte-charges et treuils, installations de forage, locomobiles à voies étroites et fistuleuses, draisiennes, etc. Dans la flotte fluviale, ces moteurs sont utilisés à la propulsion de bateaux à moteur, bacs à moteur et groupes électrogènes et d'éclairage.
À la demande des usagers, la fabrique livre les groupes propulseurs mobiles complets, où seulement les moteurs pour être montés sur fondements

Caractéristique technique

Particularités	WSM D-22	WSM D-33	WSM D-44
Type	4 temps, en ligne		
Nombre de cylindres	2	3	4
Puissance en CV à:			
750 tr/min	14,0	21,0	28,0
1000 tr/min	19,0	28,5	38,0
1200 tr/min	22,0	33,0	44,0
Alésage/course en mm	110/160		
Cylindrée en cm³	3040	4560	6080
Refroidissement	par eau, obligatoire		
Dimension extérieures en mm:			
longueur	813	1030	1218
largeur	550	570	665
hauteur	980	880	1120

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La compacité de construction du moteur WSM D-11, sa simplicité de construction ainsi que la facilité de son entretien ont décidé de son large emploi là où une grande mobilité de travail est nécessaire, c'est-à-dire dans l'agriculture, à la propulsion de petites scieries, moulins, briqueteries, ateliers mécaniques, etc. et en premier lieu, à la propulsion de batteuses.
Outre l'agriculture, le moteur WSM D-11 est utilisé avec succès dans la construction et l'industrie, à la propulsion de groupes électrogènes, installations laitières, monte-charge et treuils, bétonnières, mélangeurs, etc.
Suivant le désir de l'usager, la fabrique livre le moteur seul, ou monté sur un attelage mobile.

Caractéristique technique

Type	monocylindre, 4 temps, horizontal
Puissance	7 CV à 750 tr/min; 9,5 CV à 1000 tr/min; 11 CV à 1200 tr/min; 14 CV à 1400 tr/min
Alésage/course	110/160 mm
Cylindrée	1520 cm³
Refroidissement	par évaporation
Dimensions extérieures:	
longueur	1000 mm
largeur	850 mm
hauteur	700 mm

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Suivant sa destination, le moteur BIEL B-28 est fabriqué en quatre variétés:
a. type principal BIEL B-28 pour la propulsion directe de pompes rotatives à incendie et industrielles; est livré sans réservoir d'essence, radiateur, etc. (à la demande du client, l'on ajoute un injecteur);
b. type BIEL B-28C monté sur châssis avec réservoir à essence, radiateur et autre équipement, comme groupe propulseur complet;
c. type BIEL B-28P destiné à la propulsion de machines de construction, est équipé d'une boîte réduisant de moitié la rotation de l'arbre-vilebrequin;
d. type BIEL B-28S destiné à la propulsion de moto-pompes à boue et autres pompes d'aspiration de liquides crasseux, est équipé d'un injecteur

Caractéristique technique

Particularités	BIEL B-28	BIEL B-28C	BIEL B-28P	BIEL B-28S
Type	bi-cylindre, 2 temps			
Puissance caractéristique en CV/à 3000 tr/min	28	27	25	27
Alésage/course, en mm	96/76			
Cylindrée, en cm³	1100			
Refroidissement	par eau			
Dimensions extérieures, en mm:				
longueur	585	825	825	825
largeur	430	630	630	630
hauteur	470	860	860	860
Poids mort du moteur en kg	60	125	135	127

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Grâce à son poids peu élévé le moteur BIEL B-8 se prête parfaitement au fonctionnement dans les groupes mobiles. Suivant son utilisation, il est produit en 4 varietes comme:
a. type principal BIEL B-8 sans boîte de vitesses, pour la propulsion de pompes d'incendie, pompes à boue et autres, arroseurs et tracteurs horticoles, transporteurs ou autre matériel analogue
b. type BIEL B-8 E équipé d'un limiteur de tours (règle à 2200 tr/min), pour la propulsion directe de génératrices d'une puissance de 3 KW
c. type BIEL B-8P équipé d'une boîte réduisant de moitié la rotation de l'arbre-vilebrequin, et d'un embrayage automatique — pour la propulsion de bétonneuses, mélangeurs, extracteurs et autres dispositifs dans la construction (en remplacement des moteurs électriques)
d. type BIEL B-8 PR — également équipé d'une boîte réduisant de moitié la rotation de l'arbre-vilebrequin mais ne possédant pas d'embrayage automatique — destiné à la propulsion de matériel agricole tarnsportable

Caractéristique technique

Particularités	BIEL B-8	BIEL B-8E	BIEL B-8P	BIEL B-8PR
Type	monocylindre, 2 temps			
Puissance caractérisée, en CV à une rotation en tr/min de l'extrémité de l'arbre de	8	7	7,5	7,5
	3000	2200	1450	1450
Alésage/course, en mm	72/75			
Cylindrée, en cm³	343			
Refroidissement	par air			
Dimension extérieures en mm:				
longueur	550	550	680	790
largeur	540	540	540	540
hauteur	650	650	675	815
Poids mort du moteur en kg	60	60	73	83

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C'est un grand plaisir que de conduire la FSO Warszawa Modèle 57; grâce aux qualités de son moteur, une grande visibilité, une disposition aisée des leviers de commande ainsi qu'une tenue de route parfaite. L'excellent amortissage de la FSO Warszawa Modèle 57 vous assurera une conduite agréable, sans secours, même sur les plus mauvaises routes.
Le magnifique tableau de bord, riche et bien équipé de la FSO Warszawa Modèle 57, vous permettra, sans effort aucun, d'observer pendant le voyage tous les instruments de contrôle qui y sont disposés.
Si vous êtes fumeur, vous vous servirez avec aisance de l'allume-cigare électrique disposé sur le tableau de bord de la FSO Warszawa Modèle 57.
De hautes et larges portières vous permettront de vous installer aisément dans la FSO Warszawa Modèle 57, même si vous êtes d'une taille et d'une corpulence imposantes.
Le vaste coffre à bagages de la FSO Warszawa Modèle 57 vous permettra d'emporter de gros bagages pour de longs voyages.

Caractéristique technique

Moteur, type	4 temps, à essence
Alésage/course	82/100 mm
Cylindrée	2120 cm³
Taux de compression	[illegible]
Puissance nominale	[illegible] CV à [illegible] tr/min
Dimensions extérieures du véhicule:	
longueur hors tout	4670 mm
largeur hors tout	1695 mm
hauteur	1640 mm
Poids mort du véhicule	1360 kg

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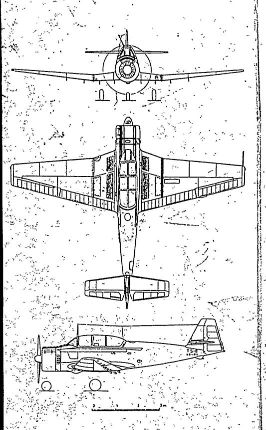
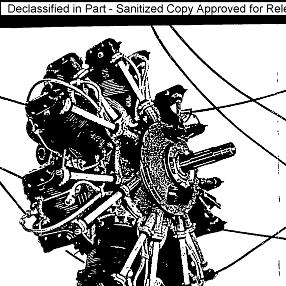


TECHNICAL DATA

Crew	— 2 persons
General layout	— Cantilever low-wing monoplane
Construction	— all metal — stressed skin
Landing gear	— tricycle type, pneumatically retracted
Power plant	— WN3, seven cylinder, air-cooled radial engine, rated at 320 h. p.
Propeller	— WR-1, two blade, "constant speed" type, diameter — 2.2 m.
Equipment:	— VHF transmitter (receiver) — radiocompass — 2 sets of blind flight instruments — Interphone installation
Controls	— double type
Dimensions:	
Span	— 10.5 m. (34.44 ft.)
Length	— 8.55 m. (28.04 ft.)
Wing area	— 19.1 m². (205.6 sq. ft.)
Weights:	
Weight empty	— 1070 kg. (2354 lbs.)
All up weight	— 1550 kg. (3410 lbs.)
Performances:	
Maximum speed	— 310 km./h. (193 m. p. h.)
Cruising speed:	— 270 km./h. (168 m. p h.)
Landing speed (with flaps extended)	— 90 km./h. (56 m. p. h.)
Rate of climb	— 6.8 m./sec. (1320 ft./min.)
Service ceiling	— 5000 m (16400 ft.)
Range	— 675 km. (420 miles) (endurance 2.5 hours)



Seven-cylinder, air-cooled radial engine with a take off pover of 320 h. p., light, durable and with low fuel consumption is an important factor in success of the aircraft.

Low thermal loading of the engine makes the aircraft suitable for hot climate operation.

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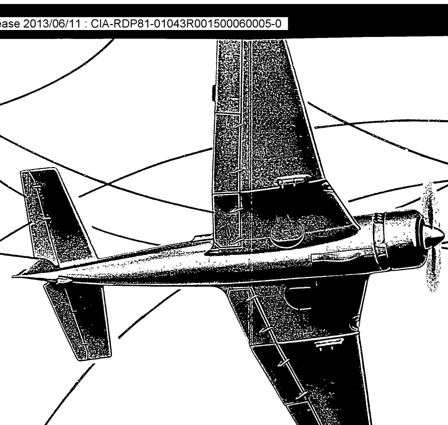
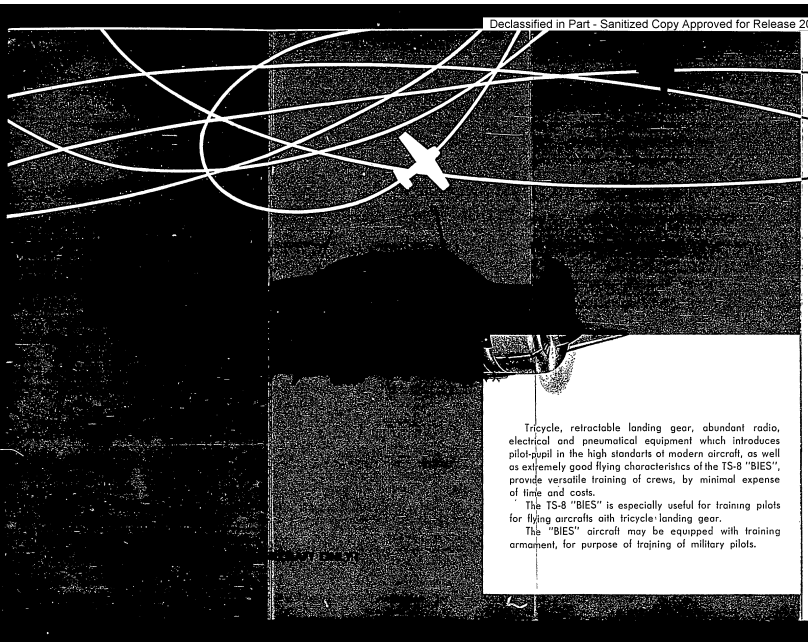


THE AIRCRAFT TS-8 "BIES"

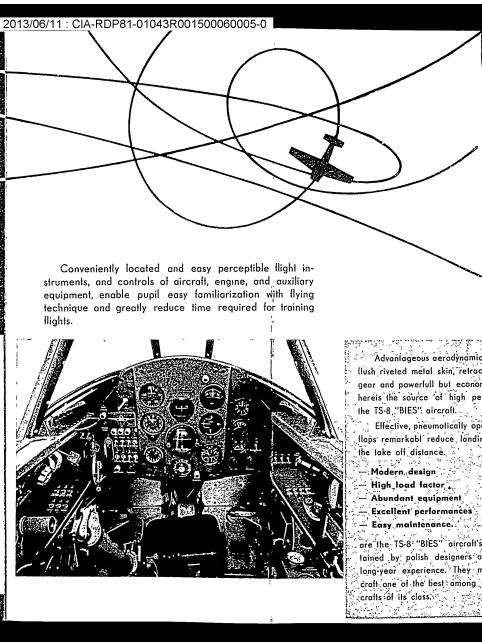
SCHOOL AND TRAINING AIRCRAFT



Tricycle, retractable landing gear, abundant radio, electrical and pneumatical equipment which introduces pilot-pupil in the high standarts of modern aircraft, as well as extremely good flying characteristics of the TS-8 "BIES", provide versatile training of crews, by minimal expense of time and costs.

The TS-8 "BIES" is especially useful for training pilots for flying aircrafts with tricycle landing gear.

The "BIES" aircraft may be equipped with training armament, for purpose of training of military pilots.



Conveniently located and easy perceptible flight instruments, and controls of aircraft, engine, and auxiliary equipment, enable pupil easy familiarization with flying technique and greatly reduce time required for training flights.

Advantageous aerodynamic form, smooth flush riveted metal skin, retractable landing gear and powerfull but economic engine — hereis the source of high performances of the TS-8 "BIES" aircraft.

Effective, pneumatically operated, slotted flaps remarkably reduce landing speed and the take off distance.

— **Modern design.**
— **High load factor.**
— **Abundant equipment.**
— **Excellent performances.**
— **Easy maintenance.**

are the TS-8 "BIES" aircraft's qualities obtained by polish designers as a result of long-year experience. They make this aircraft one of the best among the world aircrafts of its class.

Tricycle high strength landing gear, equipped with low-pressure tires, and effective, oleo-pneumatic shock absorbers, with great deflection protect the aircraft from the results of "hard landings", and enables operation on grass airfields.

Effective, pneumatically operated brakes on main wheels, controlled from both crew compartments, secure extremely good handling of the aircraft on the ground.

The tricycle landing gear gives a very good visibility for pilot during take off, landing or manoeuvring on the ground.

— **Roomy cabin for two crew-members.**
— **Comfortable and adjustable seats, with a simple regulation of harness stretch.**
— **Slide-back type canopy with extremely good visibility.**
— **excellent balanced control system.**
— **Secure for the crew, comfortable and non tiresome flight.**

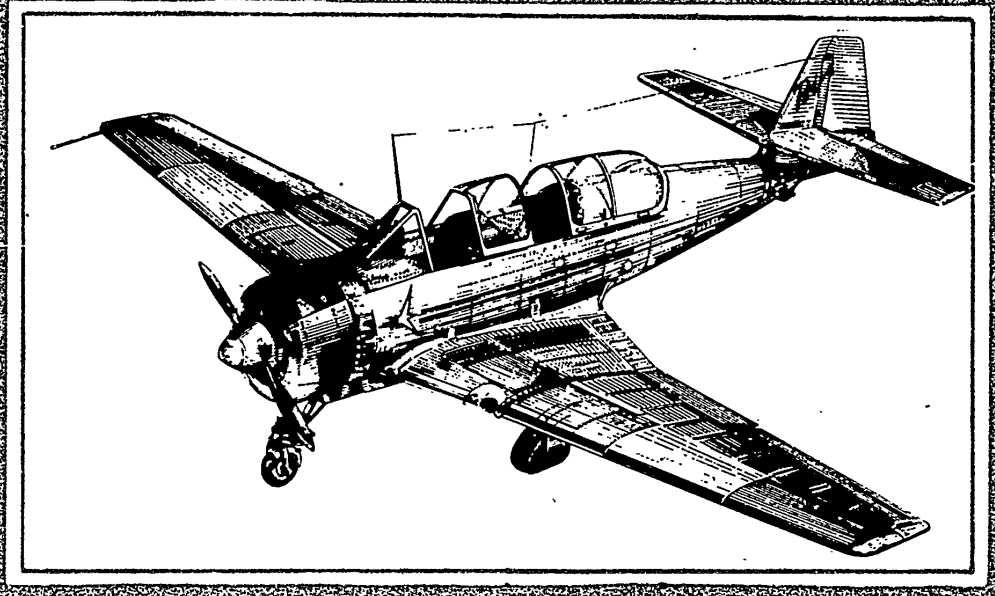
In the TS-8 "BIES" aircraft, pilot-pupil occupies front seat.

This is a factor which enables a development of self-dependence and self-confidence of the pupil.

Interphone installation, provides communication between pilot-pupil and instructing pilot.

Aircraft TS-8 „Bies"

SHORT TECHNICAL DESCRIPTION



STAT

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WARSZAWA POLAND

STAT

The TS-8 "Bies" aircraft

Short Technical Description

1. General informations

The TS-8 "Bies" aircraft is designed for basic and acrobatic training: it can be used for training of air crew prior to jet flying course.

The aircraft is suitable for instrument flying training while the special version of TS-8 "Bies" can be used as a trainer for instrument landing.

The TS-8 "Bies" is a cantilever low wing two seater with tricykle retractable undercarriage. The two seats are placed in tandem in a spacious cockpit equipped with dual controls.

Ventilation of the cockpit is ensured by means of special intakes.

The transparent plexiglass canopy ensures good visibility from the cockpit. The canopy comprises two independent sliding hoods /one over each pilot's compartment/ which can be slided backwards to improve visibility in bad weather conditions. The hoods can be ejected in emergency.

Lighting of the cockpit consists of ordinary and of ultra violet lamps.

The aircraft is equipped with standart navigation lights and with set of visible from the ground green lights indicating that the undercarriage is fully lowered.

The position of the undercarriage is shown by means of indicating lights placed both in front and in the rear compartment and by visual indicators fitted in wings and in the fuselage; the latter are well visible from both seats of the aircraft.

The aircraft is of all metal, stressed skin construction. The wing consists of three sections. Ailerons, elevator and rudder are of metal construction covered with fabric. The pneumatically retracted under-

carriage is equipped with pneumatic brakes on the main wheels and with a shimmy-damper on the fully castoring front wheel.

The aircraft is powered by the type WN-3 four stroke, seven cylinders, air cooled, radial engine, without supercharger and reduction gear, developing 320 H.P. take off power. The aircraft can be equipped with variable pitch, constant speed air screw type WR-1 of the 2,2 m diameter or by two blade, fixed pitch wooden air screw of the same diameter.

2. Leading data

2.1. Dimensions

Span	10.50 m./34 ft.5ins./
Length	8.50 m./27 ft. 10 ins./
Height /cockpit/	2.25 m./7 ft. 4 ins./
Height /fin/	3.00 m./9 ft.10 ins./
Main wheels track	2.35 m./7 ft.8 ins./
Wheel base	2.05 m./6 ft. 8 ins./
Wing area	19.1 m^2./212.2 sq.ft./
Fuel tank capacity	215 l./47.25 imp.gal./
Oil tank capacity	20 l. /4.4 imp.gal./

2.2. Weight of aircraft

All-up weight /full acrobatics allowed, overload coefficient $\frac{+6}{-3}$ /	1550 kg. /3410 lbs./
All-up weight /no acrobatics allowed/	1760 kg. /3872 lbs./
The weight of trainer version comprises:	
aircraft with power plant	1070 kg. /2354 lbs./
basic radio equipment	90 kg. /198 lbs./
fuel and oil	160 kg. /352 lbs./
crew	180 kg. /396 lbs./
Total	1500 kg. /3300 lbs./

2.3. Performance /trainer version/

Maximum speed at sea level	310 km./h. /192 m.p.h./
Cruising speed /75% power/	270 km./h. /168 m.p.h./
Stalling speed /no power, flaps up/	120 km./h. /75 m.p.h./
Stalling speed /no power,flaps down/	100 km./h. /62 m.p.h./
Speed for best rate of climb	175 km./h. /109 m.p.h./
Maximum diving speed	500 km./h. /310 m.p.h./
Maximum speed with flaps down	180 km./h. /112 m.p.h./
Initial rate of climb:	
with fixed pitch air screw	5.4 m. /sec. /1064 ft./min./
with variable pitch air screw	6.8 m./sec./1340 ft./min./
Ceiling:	
with fixed pitch air screw	5000 m. /16400 ft./
with variable pitch air screw	6500 m. /20992 ft./
Take off run	390 m. /426 yds./
Landing run, flaps down brakes on	200 m. /219 yds./
Flight endurance /235 H.P.,2100 r.p.m./	2.5 h.
Range	675 km. /420 miles/

2.4. Power plant

Number of cylinders	7
Swept volume	13.4 l.
Compression ratio	6.3 : 1
Flight at max. power:	
power developed	340 H.P.
engine speed	2500 r.p.m.
specific fuel consumption	270 g./H.P.h.

Flight at take off power:	
power developed	320 h.p.
engine speed	2350 r.p.m.
specific fuel con-sumption	250 g./h.P.h.
Flight at continous rated power:	
power developed	285 h.p.
engine speed	2250 r.p.m.
specific fuel con-sumption	250 g./H.P.h.
Flight at cruising power /75% take off power/:	
power developed	240 H.P.
engine speed	2100 r.p.m.
specific fuel con-sumption	210 g./H.P.h.
Fuel	aero-engine petrol 72 octanes
Specific oil consumption /cruising/	5 g./H.P.h.
Weight of engine	240 kg. /528 lbs./

3. Airframe construction

3.1. The outer wing

The outer wing attached to the wing centre section is of a stressed skin construction with leading edge torsion box formed by the wing nose and the front face of spar located approximately at 30% chord.

The skin of the leading edge box is of thick metal sheet and is stiffened by means of nose ribs and spanwise stringers.

Rear part of the outer wing taking ailerons and flaps loads has thin metal sheet skin.

The whole skin is fastened by means of countersunk rivets. The outer wing is attached to the wing centre section by means of flanged connection.

3.2. The wing centre section

The wing centre section is of stressed skin construction similar to that of the outer wing but with gradually increasing thickness of the spar booms. Right and left side of the centre section are slighty inclined downwards; they are fastened to the central part of the spar which forms the main member of the wing construction. The lugs for fuselage attachment to the wing are on the central part of the spar and on the front and rear part of the No. 1 rib.

In the rear part of the wing central section are the main wheels bays and the space for special equipment. The landing light is located on the left hand side in the wing nose of central section.

3.3. Fuselage

Fuselage is of a stressed skin construction with dural sheet skin stiffened ny means of frames and Z-section longerons.

In the front section of the fuselage is located the cockpit equipped with two seats and separated from the engine by a fireproof bulkhead.

The engine mounting is attached to the fuselage by means of four bolt joints. In the lower section of the fuselage are placed three interconnected fuel tanks.

3.4. Tail unit

The tail plane is attached to the fin by means of four joints. All the control surfaces and flaps are of similar construction. It comprises a tubular steel spar and light dural sheet ribs. The tubular spar is in each case located in the nose and its additional purpose is to mass-balance the control surface.

All the control surfaces and flaps are fabric covered.

The control surfaces are aerodynamically balanced.

3.5. Undercarriage

Tricycle undercarriage with nose wheel is pneumatically retracted.

Main wheels legs turn on bearings located in wing centre section between the third and the fourth ribs and retract into bays in the wing centre section; the nose wheel retracts into the fuselage. When the undercarriage is retracted the bays are covered by special fairings.

The nose wheel unit is attached to the bracket of lattice construction fitted in the front part of the fuselage.

The udercarriage comprises also pneumatic legs; the nose wheel damper unit is of a two stage type.

Wheels are made of magnezium alloy and are equipped with differential pneumatic brakes. The front wheel is fully castoring and is fitted with shimmy-damper.

3.6. Controls

The aircraft is equipped with dual controls /for pupil and for instructor/. The control system is of rod and lever type while all the linkades are fitted with ball bearings.

The engine is controlled by means of push--pull rods.

The pneumatically operated flaps are linked to the actuating unit by a series of rods.

3.7. Power plant and air screw

The WN-3 seven cylinder, air cooled engine developes 320 H.P. at 2350 r.p.m.

The engine drives a two blade wooden fixed pitch air screw or a variable pitch constant speed air screw.

The engine cowling consists of two parts which can be easily removed for maintenance or repair work. Cowling gills in front of the cylinders enable control of the air flow during the flight. The engine is equipped with a radiator and a compressed air starter.

3.8. Cockpit accessories

Seats are designed for back type parachute and each of them can be adjusted by the pilot. Strong harness attached in an ingenious way does not hamper movements of the pilot.

Both compartments are equipped with a full set of instruments. The instrument panels are mounted on rubber Lord blocks.

3.9. Instruments

The set of instruments comprises:

- magnetic compass
- air speed indicator
- altimeter
- rate of climb indicator
- artificial horizon and turn indicator
- engine controller
- rev-meter
- clock

3.10. Basic radio equipment

The aircraft is equipped with the VHF radio set, automatic radio compass with repeaters in each compartment and an intercom.

3.11. Additional equipment for instrument flying

For instrument flying the aircraft is equipped with radio altimeter, approach receiver and gyro magnetic compass with repeaters in both compartments instead of ordinary magnetic compass.

The remote controls of radio equipment are located only in the front compartment. All the switches and knobs of radio equipment are grouped on a special panel on the pilot's

right hand side in the front compartment. On both sides of each compartment are placed other controls and indicators such as extinguisher lever, switches of electrical and pneumatical system, manometers etc.

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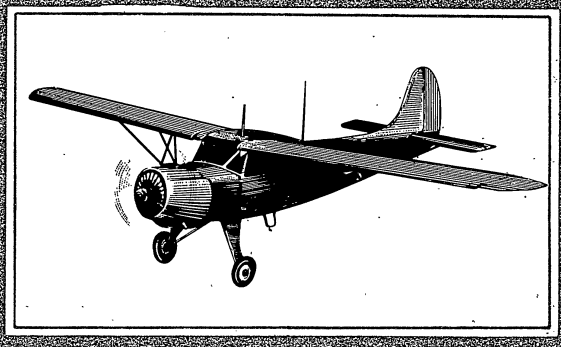
Aircraft Jak-12M

SHORT TECHNICAL DESCRIPTION



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WARSZAWA POLAND

The Jak-12M aircraft

Short technical description

1. General information

The high-wing monoplane Jak-12M powered by the AI-14R air cooled engine driving the variable pitch W-530-D11 air screw may be used in three versions: as passenger aircraft, as ambulance and as agricultural aircraft. Conversion from one version into any of the two others can be carried on an aerodrome /that is in field working conditions/.

The Jak-12M aircraft is equipped with the blind flying instruments, radio set and automatic radio compass.

The spacious and well lighted cabin is ventilated in summer and heated in winter. Easily detachable inspection panels, covers and cowlings as well as comfortable access to the accessories of the aircraft simplyfy the maintenance and the operation of the aircraft.

The take off and landing characteristics of the Jak-12M allows operating the aircraft outside aerodromes in summer and in winter. The conversion of wheels into ski landing gear can be carried on an airfield. Good stability in the air and easy control of the aircraft guarantee full safety of the flight.

The passenger version taking full fuel supply can carry two passengers with hand luggage.

Removing the ARK-5 radio compas and filling tanks with 115 litres /25.3 imp.gallons/ of fuel only allows the aircraft to carry three passengers with hand luggage at the distance of 450 km. /280 miles/.

At short distances the aircraft can carry in the cabin 300 kg. /660 lbs./ load on the conditions that the weight of fuel in tanks does not exceed 50 kg.

/110 lbs./ and that the ARK-5 radio compas as well as right hand side front seat are removed.

The ambulance version can carry one patient on stretchers and a medical attendant or three sitting up patients. The medical equipment of the ambulance version ensures an adequate care of the patients during the whole flight.

The agricultural version is equipped with accessories for spraying fluids or spreading dusts, fertilizing chemicals and seeds. The equipment comprises the hopper, the feeding device, the fan with the pump and the spraying device.

2. Leading data

The Al-14R engine

Number of cylinders	9
Continus rated power	220 H.P.
Take off power /maximum/	240 H.P.
Cruising power	165 H.P.
Specific fuel consumption at continus rated power	240-250 g./H.P.h.
Cooling	by air flow
Engine weight	200 kg./440 lbs./

Dimensions

Length	9 m./29 ft. 6 ins./
Span	12.6 m./41 ft. 4 ins./
Tail plane span	4.03 m./13 ft. 3 ins./
Wing area with ailerons and closed extension flaps	23.86 m^2./256.5 sq.ft./
Wheel track	2.2 m./7 ft. 4 ins./

Performance and weight of the passenger version and the ambulance version of the Jak-12M aircraft

Performance

Maximum speed in level flight	179 km./h./111 m.p.h./
Rate of climb at sea level	4.1 m./sec./807 ft./min./
Time of climbing:	
to 500 m./1640 ft./	2.2 min.
to 1000 m./3280 ft./	4.7 min.
Take off from concrete runway, at take off. power, 2350 r.p.m. and 20° lowered flaps:	
take off run	126 m./138 yds./
take off speed	80 km./h./50 m.p.h./
take off length to clear 25 m./82 ft./	450 m./490 yds./
Take off in similar conditions as above but at continus rated power and 2050 r.p.m.:	
take off run	150 m./160.5 yds./
take off speed	80 km./h./50 m.p.h./
take off length to clear 25 m./82 ft./	535 m./587 yds./
Landing on concrete runway with flaps lowered 40° and brakes on:	
landing run	190 m./207 yds./
touch down speed	73 km./h./45 m.p.h./
length of landing from 25 m./82 ft./	390 m./425 yds./
Landing in similar conditions as above but with flaps up and brakes off:	
landing run	465 m./507 yds./
touch down speed	82 km./h./51 m.p.h./

length of landing from 25 m./82 ft./	765 m./834 yds./
Service ceiling	4160 m./13650 ft./
Time of climbing to the service ceiling	40.1min.
Still air range at 500 m. /1640 ft./	765 km./473 miles/
Flight endurance at 500 m. /1640 ft./	6 h 29 min.

Weights of the passenger version

Empty weights:	
aircraft converted to carry two passengers	1026 kg./2257 lbs./
aircraft converted to carry three passengers	1002 kg./2205 lbs./
Maximum weight in flight with two or three passengers	1435 kg. /3170 lbs./
Normal weight in flight:	
with two passengers	1428 kg. /3141 lbs./
with three passengers	1435 kg. /3170 lbs./
Useful lead in normal flight:	
with two passengers	402 kg. /884 lbs./
with three passengers	433 kg. /952 lbs./
Useful load in flight with two passengers consists of the following weights:	
pilot	80 kg. /176 lbs./
passengers	160 kg. /352 lbs./
fuel of specific weight 0,750	136 kg. /299 lbs./=180 l.
oil of specific weight 0,893	14 kg. /31 lbs./
hand luggage	12 kg. /27 lbs./
Useful load in flight with three passengers consists of the following weights:	

pilot	80 kg. /176 lbs./
passengers	240 kg. /528 lbs./
fuel	87 kg. /191 lbs./116 l
oil	14 kg. /31 lbs./
hand luggage	12 kg. /27 lbs./

Weights for the ambulance version /stretchers and medical attendant/

Empty weight	1014 kg. /2251 lbs./
All up weight	1374 kg./3023 lbs./
Useful load	360 kg. /792 lbs./
Useful load in flight consists of the following weights:	
pilot	80 kg. /176 lbs./
patient	80 kg. /176 lbs./
medical attendant	80 kg. /176 lbs./
fuel	92 kg. /202 lbs./
oil	14 kg. /31 lbs./
luggage or stretchers	14 kg. /31 lbs./

Performance and weights of the agricultural version of Jak-12M

Performance

Range of economical speeds	130-140 km./h./81-87 m.p.h./
Rate of climbing at sea level for the all-up weight of 1450 kg./3190 lbs./	
at continus rated power	
dust spreading version	2,6 m./sec. /512 ft./min./
spraying version	3.2 m./sec. /630 ft./min./
at cruising power and 1860 r.p.m.	
dust spreading version	1 m./sec./197 ft./min./
spraying version	1.2 m./sec./236 ft./min./

The length of grass take off run for the all-up weight of 1450 kg./3190 lbs./, with flaps lowered 22°, at take off power:	
dust spreading version	124 m./139 yds./
spraying version	110 m./120 yds./
The length of grass landing run for the all-up weight of 1450 kg./3190 lbs./ with flaps lowered 22° and with brakes on:	
dust spreading version spraying version	180 m./197 yds./

Weights

Empty weight:

dust spreading version	978 kg. /2152 lbs./
spraying version	987 kg. /2171 lbs./
All up weight	1450 kg./3190 lbs./
Useful load:	
dust spreading version	472 kg. /1038 lbs./
spraying version	473 kg. /1019 lbs./
Useful load of the dust spreading version consists of the following weights:	
pilot	80 kg. /176 lbs./
chemicals	300 kg. /660 lbs./
oil /supply for two hours flight/	10 kg. /22 lbs./
fuel /supply for two hours flight at sea level with the speed of 135 km./h./84 m.p.h./	82 kg. /180 lbs./
Useful load of the spraying version consists of the following weights:	

pilot	80 kg. /176 lbs./
chemicals	300 kg. /660 lbs./
oil /supply for two hours flight/	10 kg. /22 lbs./
fuel /supply for two hours flight at sea level with the speed of 135 km./h./84 m.p.h./	73 kg./161 lbs./

3. Construction and accessories

The fuselage structure comprises welded steel tubes and Dural ribs covered with fabric.

The front part of the cabin, covered in the upper section with transparent panels, is equipped with doors on both sides while in the rear compartment the door is fitted on the left hand side. The doors are equipped with emergency ejecting device. The cabin is equipped with ventilating and heating system.

The wing and control surface structure is made of Dural and is covered partly with Dural sheets and partly with fabric.

The tricykle undercarriage with the tail wheel is of non retractable type. Main wheels are equipped with brakes. The undercarriage is fitted with rubber rope shock absorbes and the hydraulic damper. The tail wheel is fully castoring.

The ailerons, elevators and rudders are controlled by means of cables while the flaps are pneumatically driven. The air screw is of a variable pitch.

The aircraft is equipped with the pneumatic system for engine starting, wheels braking and for flaps controlling.

Fuel tanks are of 180 litres /40 imp.gallons/ capacity while the oil tanks contains 25 litres /5.5 imp. gallons/ of oil.

Electrical installation supply the energy to lighting and navigation lamps, to instruments, radio equipment, heaters and to wiper.

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POLISH FOREIGN TRADE PUBLICATIONS – WARSZAWA
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ACHIEVEMENTS OF THE POLISH CIVILIAN AVIATION

The purpose of to-day's lecture is to acquaint the Representatives of foreign Embassies and Legations accredited in Poland as well as the press representatives with the history of development and with modern problems of aircraft design in Poland after the World War II. The Polish production of both gliders and engine aircraft of low and medium power has reached a stage of technical perfection which together with achievements in both the field of pilotage and record performance enables us to speak to-day of an export of a number of products of our aircraft industry working under the trade name of Polskie Zakłady Lotnicze /PZL/.

The continuation of this name known since pre-war years is meant to couple with the good technical, productional and commercial traditions of the pre-war Polish aircraft industry. For a number of PZL aircraft knwon then like the fighter Super P-24, the light bomber "Sum", the bomber "Łoś", the diver-fighter "Wilk", the reconnaisance aircraft "Mewa" and the training aircraft "Wyżeł" have won a good name in the world flying opinion and a credit on a number of International Exhibitions of Paris, Milan, Belgrade and Stockholm. This resulted in efforts of commencing export of these planes to a number of countries as for instance to Bulgaria, Greece, Roumania and Turkey.

As a natural effect of military aircraft export a considerable export of sport aircraft and gliders was noted. This latter was influenced by the fact that both the glider and sport aircraft designs have achieved in the meantime a number of successes whereas the PZL aircraft, and especially the RWD ones have won world reputation by establishing many a world record and winning the Challenge de Tourisme Internationale competition of 1932 and 1934.

The Polish aircraft industry has also specialised in the production of light sport free balloons of high class which have achieved a number of successes in the past in the International Gordon Benett Balloon Competitions.

In the field of aircraft combustion engines a number of original successful designs were developed in the same time such as the radial engine G-1620 and the bank engine PZL-Foka which as to their idea of construction and elaboration of detail have been rated among the leading in the world. It is also worth to be mentioned that in the field of designing compressor-and-turbine jet engines a suitable experimental engine was developed qualifying considerably in advance of contemporary works conducted in other countries respectively.

The Polish aircraft industry of that time was marked for high class of designing on the basis of original ideas, own standards and methods of high quality industrial production which won common recognition. On the other hand with regard to the production of low and medium power aircraft engines based on foreign licence the Polish aircraft industry has frequently reached achievements superior to those noted abroad.

The outbreak of World War II has brought Poland not only the disastrous occupation which eliminated further development of the Polish domestic aviation but also in its outcome a nearly complete destruction of aircraft industry and research establishments as well as complete devastation of airfields and flying schools. The greatest losses were suffered in the form of casualties among flying specialists, designers, pilots, mechanics and technologists.

In the field of motorless aviation the situation was favourable since already during the period following immediately the war a suitable specialist personnel was recruited and trained whereas it was possible to commence the production of prototypes and series of gliders despite primitive and hard conditions with regard to the design and production of a glider being relatively simple as compared with those of an engine powered aircraft.

The general situation in the field of engine aviation was complicated by the lack of own aircraft engine production upon which the development of various types of utility aircraft could be based. Since the needs of both civilian and sport power aviation were great since the beginning efforts were made, for obvious reasons, to meet them directly by rapidly launched production based on licences or even by foreign purchases. Thus the production offered to-day for export includes first of all aircraft based on licences purchased by Poland from the Soviet industry and represented by the aircraft "Jak- 12M" and the helicopter SM-1, of high utility values and good performance factors. These products, owing to various possibilities of their application can be used for service in numerous fields of economy.

and economic coefficients but also owing to the correct pilotage and good flight properties at low and high speeds and to the possibility of performing full acrobatics, to represent top achievements in its class.

Most interesting developments are noted in the field of the Polish motorless aviation.

The Polish gliders are marked for extremely quick and efficient assembly and dismantling which in case of the "Jaskółka" takes only a few minutes of time. The number of loose parts is reduced to the minimum some of the gliders being equipped with special devices serving the elimination of play occuring in fixings following long lasting use.

To the best known Polish gliders belongs the "Jaskółka" high performance single-seater of which the following versions have been developed: Albatros", "Jaskółka-M", "Jaskółka-W", "Jaskółka-Z" and "Jaskółka-L".

Next very successful glider presenting a two-seat version of the "Jaskółka" is the "Bocian", type S2D-9 bis, also holder of many national and world records.

An interesting design development presents the single seat training and performance glider Mucha presenting various improvements of glider technique.

An advanced design displays the "Czapla" two-seater for both primary training, dual control flying instruction and first solo flights as well as for acrobatics learning.

The SZD-18 "Czajka" training two-seater capable of flying with or without cabin is fitted with a wheel undercarriage of extremely soft shock absorption.

It is worth to be mentioned that the school glider craft including the IS-3, "ABC" and "Salamandra" gliders have found very wide application not only in Poland but also in the Chinese People's Republic.

Sales agents for the Polish aircraft industry are the "Motoimport" responsible for advertising, information and trade.

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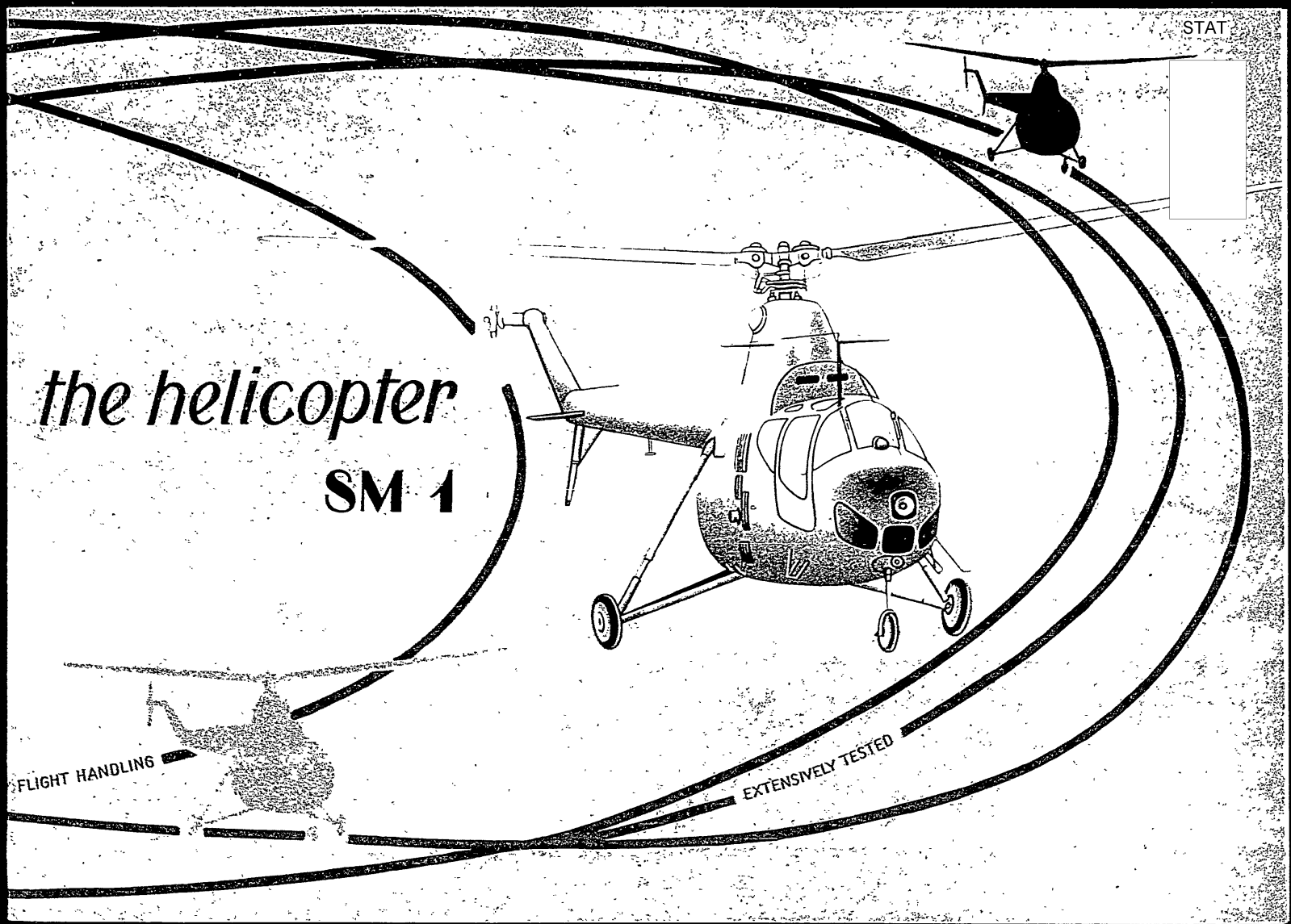
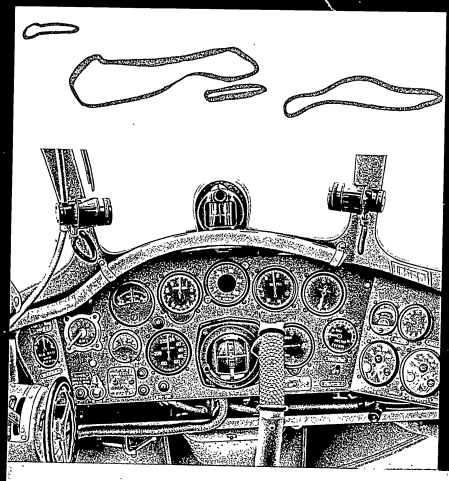
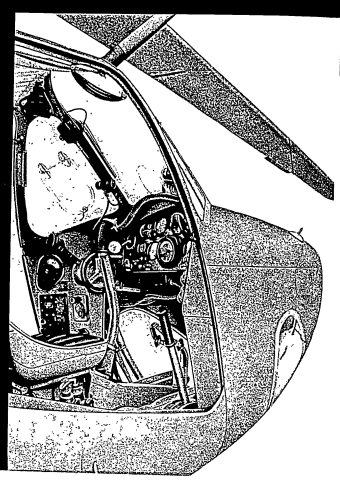


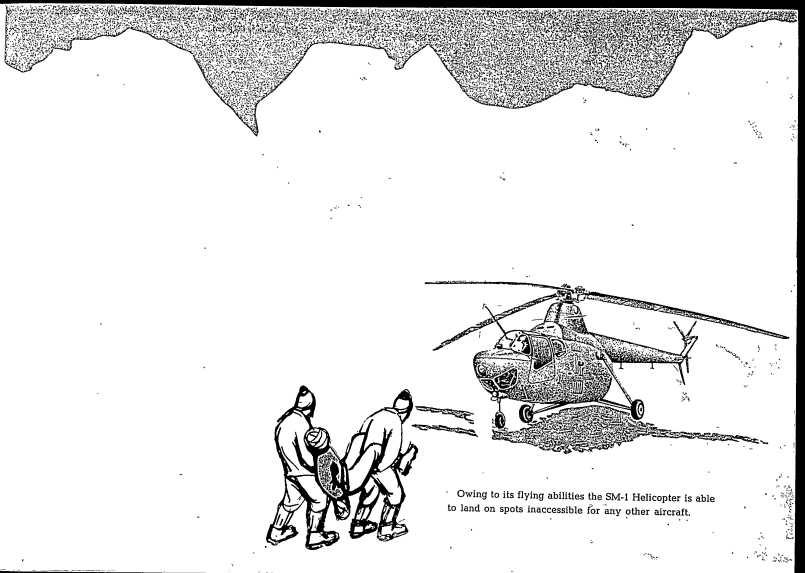


The standard pilot's controls and navigational aids are completed with modern radio equipment such as: radio-altimeter, radio semi-compass and other instruments to facilitate flying in IFR and night conditions.

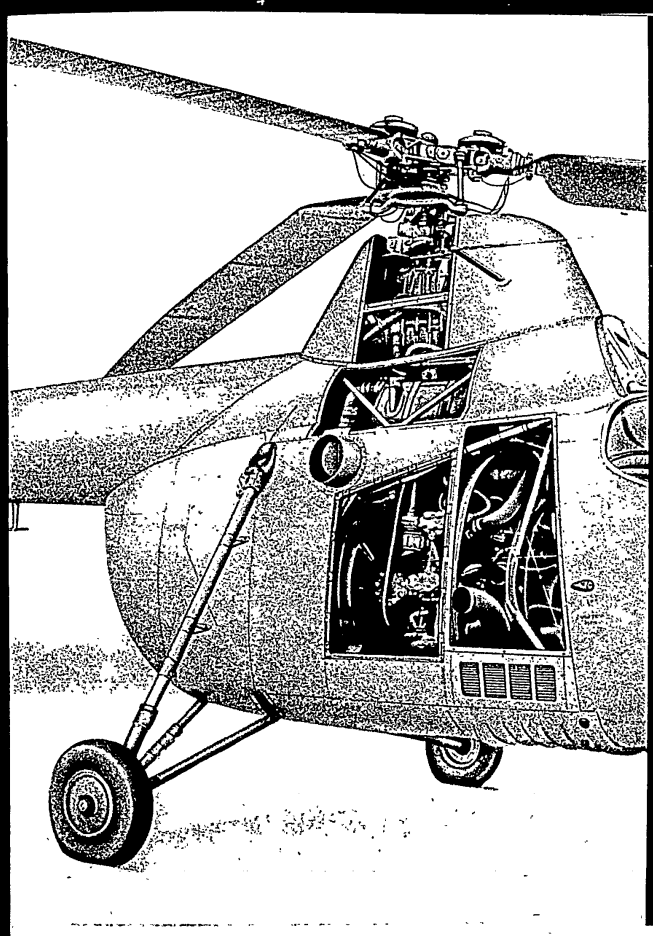


The helicopter is well controllable what makes the pilotage a real pleasure.

Control trimmers allowing setting of the control stick in the desired position enable the pilot to make long flights without fatigue.



Owing to its flying abilities the SM-1 Helicopter is able to land on spots inaccessible for any other aircraft.

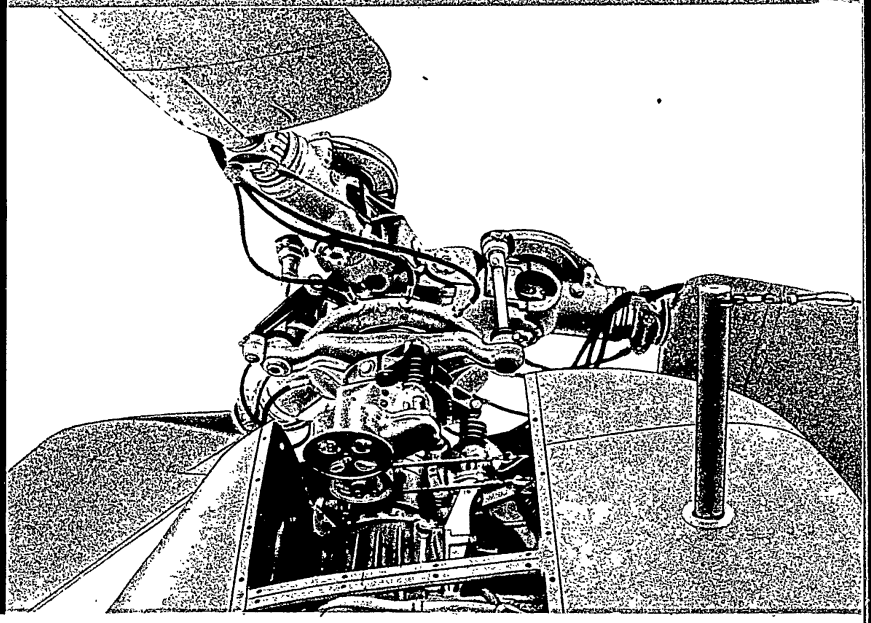


The helicopter is powered by an air cooled radial engine of 575 h. p. maximum output with compressed air starting.

The engine develops at its maximum output a considerable surplus power over the cruising output, assuring high maximum speed, high rate of climb and high service ceiling.

This feature allows the use of the helicopter in high mountain flights.

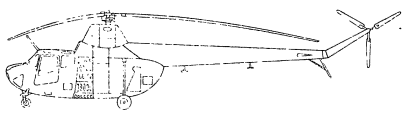
An easy access to the engine facilitates its servicing.

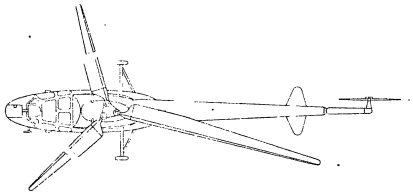


The helicopter is provided with a deicing installation preventing icing of the rotor blades, thus allowing the exploitation of this machine in cold climate countries.

Deicing device is very rarely encountered in other types of helicopters.

The possibility of landing by autorotation is an additional characteristic feature of the helicopter SM-1. It means maximum security.





Technical Data of the SM-1 Helicopter

Main rotor diameter	14.00 m. (46 ft.)
Rotor blade number	3
Length without rotors	12.11 m. (39.7 ft.)
Overall length	16.95 m. (55.6 ft.)
Overall height	3.30 m. (10.8 ft.)
Track	3.30 m. (10.8 ft.)
Weight empty	1785 kg. (3935.2 lbs.)
All-up weight	2250 kg. (4960.3 lbs.)
Useful load	465 kg.(1025.1 lbs.)
Maximum speed in level flight	200 km./h. (124.3 m.p.h.)
Maximum rate of climb	6 m./sec. (1182 ft./min.)
Time of climb to 1000 m.	4 min.
Time of climb to 3000 m.	12 min.
Absolute ceiling	5000 m. (16400 ft.)
Maximum range	385 km. (239 miles)
Maximum endurance	3 h. 24 min.
Take-off power	575 h.p.
Cruising power	323 h.p.
Fuel consumption	225—240 g./h.p.h. (4.86—5.29 lbs./h.p.h.)

Fuselage structure — welded steel tube lattice.
Tail boom structure — semi—monocoque.
Rotor structure — mixed, steel and wood.
Rotor blades — articulated with friction dampers on vertical hinges.

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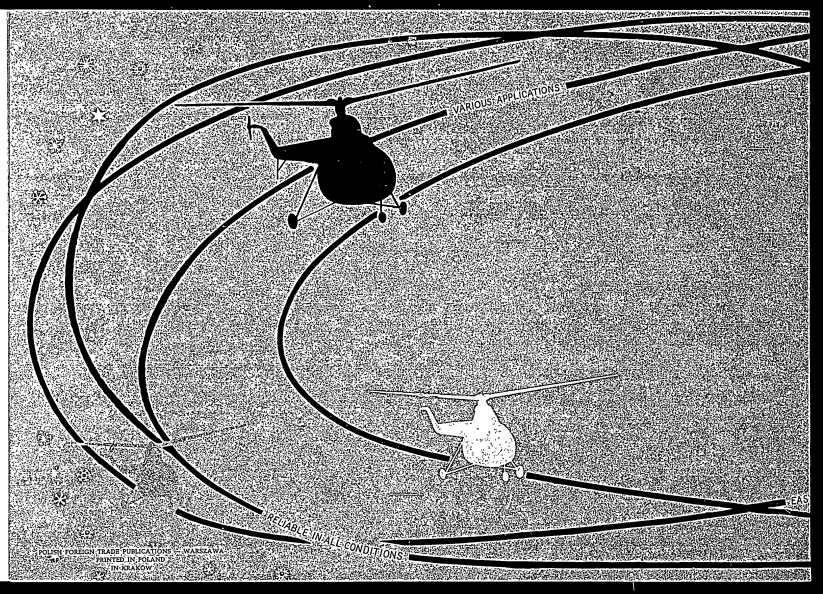

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Specification of the "JAK-12 M" Aircraft

DIMENSIONS:

Span	— 12.60 m. (496 ins.)
Length	— 9.00 m. (355 ins.)
Height	— 3.12 m. (123 ins.)
Wing area	— 23.86 m². (256 sq. ft.)

WEIGHTS (passenger flights):

Empty weight	— 1026 kg. (2262 lbs.)
All up weight	— 1450 kg. (3197 lbs.)

PERFORMANCE:

Maximum speed	— 182 km./h. (113 m. p. h.)
Cruising speed	— 160 km./h. (99 m. p. h.)
Landing speed (with flaps extended)	— 73 km./h. (45 m. p. h.)
Rate of climb	— 4.1 m./sec. (13 ft. min.)
Service ceiling	— 4160 m. (13649 ft.)
Range	— 765 km. (475 miles)

POWER PLANT:

Engine	— AI-14R, nine cylinder, air-cooled, rated power 240 h. p. at 2350 r. p. m.
Propeller	— two blade, metal, variable pitch.

EQUIPMENT:

The "JAK-12M" aircraft has a full set of instruments.

The radio equipment includes a radio-compass and a V. H. F. radio-station. The cabin has normal and ultraviolet lights. The aircraft is provided with navigation lights and a landing light.

All elements of the plane and the power plant are well accessible and easy in maintenance. A two part engine cowling can be easily taken off when servicing the engine. A shutter in front of the cylinders allows to regulate air-passage during the flight.

A metal frame work with fabric covering and, where danger of damage exists, sheet dural covering — is resistant enough to atmospheric effects.

The slotted and strut-braced wings can be easy dismounted.

Owing to the trimmer at the elevator, which is regulated by the pilot during the flight, the aircraft is easy to fly at full range of speeds and various loads.

The steerable tail wheel can be coupled with the steering mechanism allowing easy manoeuvering on the ground.

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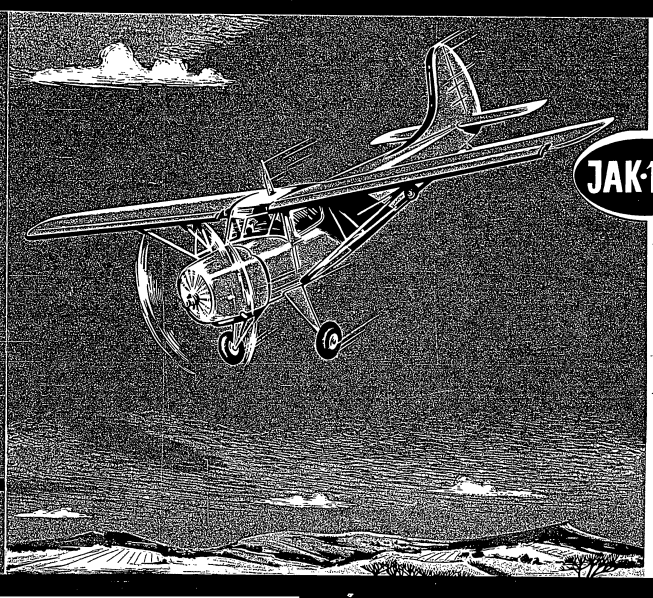

JAK-12M

suitable for:

- passenger flights
- sick transport
- freight and post transport
- agricultural and forestry purposes

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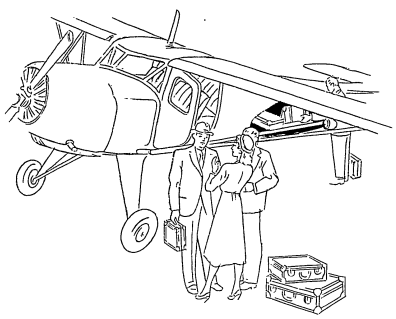
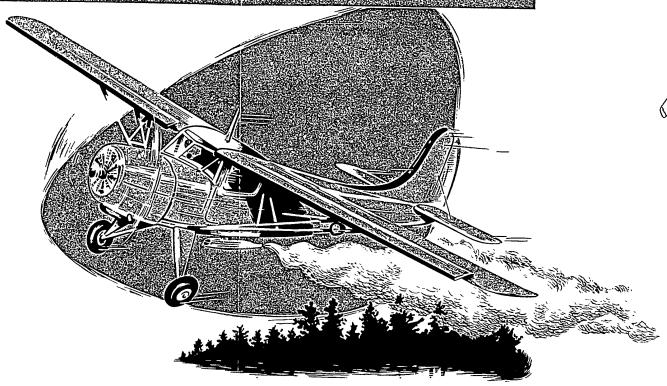
It is very easy to adapt the equipment of the aircraft to one of its purposes and this can be performed within a maximum two hours, even in field conditions.



The "JAK-12 M" aircraft can be used for the transport of 3 passengers in a comfortable, well ventilated cabin, which assures extremely good visibility for the pilot.

The aircraft is equipped with instruments which allow flights in bad visibility and at night; it can start even in difficult ground conditions.



The "JAK-12 M" aircraft can be used for crop and forest dusting and spraying purposes and for sowing chemical manure and seeds.

The spraying installation, provided with a container of approximately 300 kg. (600 etw.) capacity for spraying or sowing material, reliable in operation and serviced by the pilot during the flight, allows during one passage to dust or spray strips of following widths:

— dusting forests, fields and gardens	60—90 m. (65—98 yards)
— spraying fields and gardens	40—60 m. (43—65 yards)
— sowing chemical manure	15—20 m. (16—21 yards)
— sowing seeds	18—22 m. (19—24 yards)

Small surface needed for starting and landing (take off and landing distance appr. 120 m (180 yards) permits operation bases to be located in the neighbourhood of areas to be sprayed.

A light wall-plate mounted for this purpose between cabin and spraying installation protects the pilot against harmful effects of the chemicals.

The "JAK-12 M" aircraft can be used as a sanitary aeroplane for transporting a sick person on a stretcher, accompanied by a doctor or an orderly, who have full possibility to look after the patient during the flight.

The cabin is easy accessible and the sick person can be placed in and taken out of the cabin by two orderlies in a very short time.

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POLISH GLIDERS

motoimport

Declassified in Part - Sanitized Copy Approved for Release 2013/06/11 : CIA-RDP81-01043R001500060005-0

motoimport

The Polish gliders of most modern construction are known all over the world.

During 1955 only the Polish pilots won 22 golden badges with 3 diamonds for 46 golden badges with 3 diamonds totally awarded, re-establishing at the same time 8 world records in the following classes: [illegible] and 13 world records and 10 country records. The gold, silver and bronze badges of the Polish pilots for Polish gliders established 13 world records and 10 country records. They got at the same time 164 diamonds to their golden badges for high performance flying.

motoimport

The Polish gliders were exhibited in recent years on many international Fairs and Exhibitions. The visitors of International Fair in Leipzig, Utrecht, Brno and Vienna were interested in Polish gliders.

During the XII International Aeronautical Show held in Paris in June 1955 pilots and gliders received a lot of attention. The flight demonstrations organized under the Control of the Aero Club of France and also on the airfield at La Bourget especially Polish Jaskółka gliders, newly developed, with the same approval by the Polish and the specialists in flight during demonstration flights in Navy Day in Bombay in November 1955 were very successful. Some years ago the Polish gliders were known only GDR and Czechoslovakia but of course and they were highly valued by the young soaring enthusiasts of these countries.

Owing to long-term construction and [illegible] workmanship very smart aerodynamic lines and perfect visibility from the pilot's cockpit Polish gliders are highly appreciated by numerous soaring enthusiasts.

MOTOIMPORT
Central Foreign Trade Office of Motor Vehicles, Spare Parts and Tractors
Warsaw 1, Poland P. O. Box 365
Telegrams: Motoimport Warszawa
Telex 81 [illegible]

Helicopter SM-1

SHORT TECHNICAL DESCRIPTION

Motoimport

WARSZAWA POLAND

The SM-1 helicopter

Short technical description

1. General information

The SM-1 helicopter is designed to carry two or three passengers. The machine can be used for various special purposes such as rescue action in inaccessible terrain /mountains, forests, marshy grounds/ and water or, after introducing certain modifications, for agricultural application /insecticide spraying and dusting of fields, forests, and orchards, topdressing and seed spreading/.

The helicopter is suitable for operation in various climate conditions; the machine is equipped with special antifreeze devices which enable its operation in artic climate.

The helicopter is powered by the AI-26 W seven cylinder, radial piston engine cooled by forced air flow.

The SM-1 helicopter employs three bladed lifting rotor, tricycle undercarriage and a motocar type cabin for pilot and passengers. In the cabin is mounted the seat for a pilot and the bench type seat for two passengers with parachutes /the bench can accomodate three passengers without parachutes/. The helicopter is equipped with accessories enabling day and night flying.

The machine can hover and it is capable of vertical take off and vertical landing. The hoverning enables passengers to get on board or to alight by means of a rope ladder in inaccessible places where landing is not possible.

2. Leading data

2.1. Dimensions

Main torot diameter 14.3 m./47 ft./

Number of main rotor blades	3
Disc area	160.5 m^2 /1726 sq.ft./
Length of fuselage	12.11 m./40 ft. 9 ins./
Maximum sweep	16.95 m./56 ft. 7 ins./
Wheel track	3.3 m./10 ft. 10 ins./
Wheel base	3.75 m. /10 ft. 5 ins./
Height	3.3 m./10 ft. 10 ins./
Ground clearance	0.4 m./1 ft. 4 ins./
Range of main rotor collective pitch control	from + 1^0 to + 13^0
Tail rotor diameter	2.5 m./8 ft. 3 ins./
Number of tail rotor blades	3
Range of tail rotor pitch control	from - 6^0 to + 11^0

2.2. Weights

All up weight	2250 kg. /4950 lbs./
Weight empty	1785 kg. /3927 lbs./
Usefull load:	
pilot	80 kg. /176 lbs./
two passengers	160 kg. /352 lbs./
fuel	175 kg. /385 lbs./
oil	25 kg. /55 lbs./
de-icing fluid	25 kg. /55 lbs./
Total...	465 kg. /1023 lbs./

2.3. Performance

Maximum speed /level flight/ at sea level	200 km./h. /124 m.p.h./
at 1000m./3280 ft./	185 km./h. /115 m.p.h./
at 2000m./6560 ft./	185 km./h. /115 m.p.h./
above 2000 m. /6560 ft./	175 km./h. /109 m.p.h./

Maximum vertical climb rate at continious rated power:	
at sea level	4 m./sec. /788 ft./min./
at 1000 m./3280 ft./	4.6 m./sec. /906 ft./min./
at 2000 m. /6550 ft./	5.1 m./sec./1005 ft./min./
at 3000 m. /9840 ft./	3.5 m./sec./690 ft./min./
Maximum vertical climb rate at maximum power:	
at sea level	6.5 m./sec./1280 ft./min./
Economical speed for climbing	90 km./h. /56 m.p.h./
Climbing time:	
to 1000 m. /3280 ft./	4.3 min.
to 2000 m. /6550 ft./	7.8 min.
to 3000 m. /9840 ft./	12.0 min.
Hovering ceiling	3000 m. /9840 ft./
Service ceiling /normal equipment of the helicopter does not comprise oxygen system - the machine should not operate above 4000 m. /13120 ft./	5000 m. /16400 ft./
Maximum stil ait range at 1000 m. /3280 ft./ with speed of 140 km./h. /87 m.p.h./	385 km. /239 miles/

Endurance of flight, at 1000 m./3280 ft./ with speed of 90 km./h. /56 m.p.h./	3 h. 24 min.

2.4. Power plant

Number of cylinders	7
Swept volume	20.6 l.
Compression ratio	6.4 : 1
Flight at take off power:	
power developed	575 H.P.
engine speed	2200 r.p.m.
boost	890 mm. Hg /35 ins.Hg/
specific fuel consumption	290-320 g./H.P.h.
Flight at continous rated power at sea level:	
power developed	430 h.p.
engine speed	2050 r.p.m.
boost	760 mm.Hg /30 ins.Hg/
specific fuel consumption	260-275 g./H.P.h.
Flight at continous rated power at 2200 m./7216 ft./:	
power developed	460 H.P.
engine speed	2050 r.p.m.
boost	760 mm.Hg /30 ins.Hg/
Flight at cruising power /75% of continous rated power/ at sea level:	
power developed	322 h.p.
boost:	
at 1960 r.p.m.	630 mm.Hg /25 ins.Hg/
at 1860 r.p.m.	960 mm.Hg /38 ins.Hg/

specific fuel consumption:	
at 1960 r.p.m.	230-255 g./H.P.h.
at 1860 r.p.m.	225-240 g./H.P.h.
Flight at cruising power /50% of continous sea level rated power/:	
power developed	215 H.P.
engine speed	1860 r.p.m.
boost	575 mm.Hg /22.5 ins.Hg/
specific fuel consumption	240-270 g./H.P.h.
Maximum time of engine running:	
at take off power	5 min.
at continous rated power	60 min.
at cruising power	unlimited
Fuel	Aero engine 92 octane petrol
Maximum oil specific consumption	15 g./H.P.h.
Dry engine weight	445 kg. /979 lbs./

2.5. Gearing

Reduction ratio between main shaft and engine	1 : 1.295
Reduction ratio between main rotor and engine	1 : 8.85
Reduction ratio between tail rotor and engine	1 : 1.52
Reduction ratio between cooling blower and engine	1 : 1

3. Construction

3.1. Fuselage

The fuselage is made of chrom-man-sil steel welded tubes; the construction is covered with non-stressed skin Dural panels while the transparent sections are covered with plexiglass. The cabin is located in the front part of the fuselage. The transparent sections of the cabin ensure good front and side visibility while two special bulged side windows enables certain visibility backwards. The cabin is equipped with a motocartype door.

Engine and engine cooling blower are mounted in engine compartment placed in the centre section of the fuselage. Main gearbox is mounted in the upper part of the fuselage above the engine.

In the rear section of the fuselage, behind the engine compartment, is mounted a Dural fuel tank of 240 litres /53 imp.gallons/ capacity. The adjustable tail plane and the tail skid with rubber foot are fitted at the end of the fuselage rear section which is of tranculated cone shape.

Inside the fuselage rear section and the tail boom run transmition shaft of the tail rotor drive, push-and-pull rods controlling tail plane position and cables of tail rotor pitch control system. Leading edge of the tail plane is made of Dural and the remaining part is fabric covered.

3.2. Power plant

The engine is equipped with a clutch engaging the transmission and with axial flow cooling blower comprising flow steering baffles. The air filter of the engine is mounted on the right hand side of the machine. Exhaust gasses run through the exhaust manifold comprising two parts ending

on both sides of the machine.

The fuel system comprises special oil valve for oil dilution when the helicopter is operating in low temperature conditions. The oil tank is of 32 litres /7 imp.gallons/ capacity. The oil is cooled by means of two radiators.

The engine is equipped with compressed air starting device comprising compressor and two bottles of 4 litres /0.9 imp. gallons/ capacity each.

The fire-fighting system consists of two bottles with carbon dioxide and of an alarm device warning the pilot about the increase of temperature. Engige cooling can be controlled by means of a set of adjustable gills.

3.3. Transmission

From the engine the drive is taken up to the main rotor and to the transmission.

The transmission comprises: the engine reduction gear fitted on the engine, the main gear box mounted above the engine, the intermediate gearbox located in the rear section of the fuselage, the tail rotor gearbox mounted near the tail rotor and various shafts connecting the gearing.

The vertical main shaft connecting the engine reduction gear with the main transmission gear is attached to the gears by means of two elastic clutches dumping the torsional vibration.

The main transmission gear employs a pair of spur gears for reduction of main rotar speed and a pair of bevel gears for reduction of tail rotor speed.

The main transmission gear is connected with the intermediate transmission gear by means of a shaft rotating in five bearings ans fitted with four universal joints compensating any

strain of the shaft.

The intermediate transmission gear does not change the speed of the shafts and its sole purpose is to alter the direction of the shaft connecting the main transmission gear with the tail rotor transmission gear. The latter finally reduces the speed of the tail rotor.

3.4. Flying controls

The control of the helicopter flight is obtained by means of changing the magnitude and the direction of the main rotor lift and by changing the tail rotor thrust.

The flying controls of the helicopter consist of:

- lever for control of pitching and rolling,
- lever for mixed control of rotor pith and thrust and of tail plane position,
- pedals for yawning control,
- steering wheels for balance device control.

3.5. Main rotor /lifting rotor/

The three blades of the main rotor are connected by means of vertical and horizontal toggle joints to the hub mounted on the main transmission gear shaft. To prevent the ground resonance special friction-dampers are fitted on the vertical toggle joints. Near the hub the blades are rectangular while the parts nearer to the blade tips are of the trapezium shape. The blade comprises the steel spar of varying section and of ribs rivetted to the spar. The blade is covered with plywood and fabric.

To the leading edges of the blades are attached special fittings with openings through which the antifreezing fluid flows on the blade surface.

3.6. Tail rotor

The variable pitch tail rotor comprises three wooden blades with metal fittings. The blades are also equipped with the antifreezing device.

3,7. Undercarriage

Tricykle undercarriage allows taxying on the ground and vertical as well as runway take off and landing. The legs are of a oleo-pneumatic type.

The tyres are of low pressure type; the front wheel is fully castoring.

3.8. Antifreezing system

The antifreezing system prevents the forming of ice on main rotor blades, tail rotor blades and on the windscreen by means of washing their surfaces with special antifreezing fluid. Beside that the windscreen is heated from the inside of the cabin by means of a hot air flow. Antifreezing fluid is spread on the windscreen surface by means of a wiper. The main tank containing antifreezing fluid is of 28 litres /6 imp.gallons/ capacity and the auxiliary tank can take 2.5 litre /0.6 imp. gallons/.

3.9. Electrical equipment

The electric energy is supplied by a generator and 28V batteries. They supply the energy to instruments, electric motors, heating units, lighting points, signaling devices and to radio equipment.

The lighting of the helicopter comprises the ceiling lamp in the pilot's compartment, the instrument panel lamp, the compass lamp, landing and taxying light and navigation lights fitted on both sides of the fuselage and on the tail.

3.10. Radio equipment

The radio equipment comprises a receiver--transmitter radio set, radio-compass and radio altimeter.

3.11. Auxiliary accessories

The auxiliary accessories comprise the flare pistol and flares and the first aid equipment.

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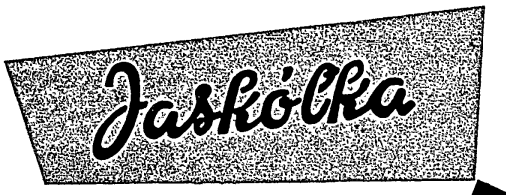

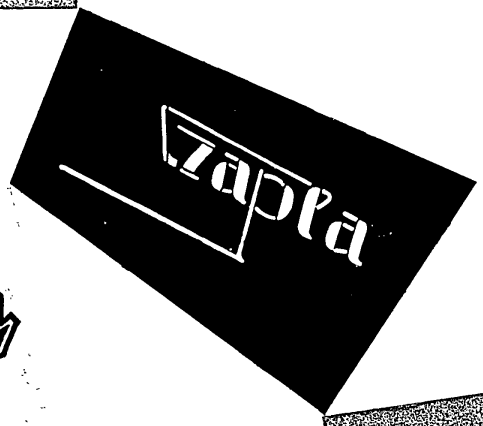

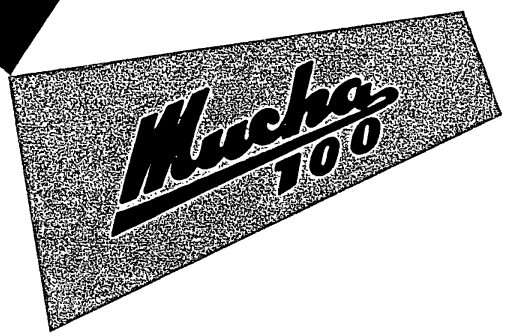

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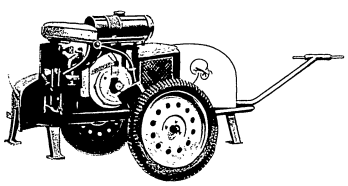
PULLING-IN-WINCH "RYŚ"



The glider pulling-in-winch works together with a launching winch.

The pulling-in-winch is an auxiliary machine intended for towing the rope of the "ŻUBR 3" winch to the launching place from the place of releasing the glider. The pulling of the rope by means of the pulling-in-winch spares a lot of time in comparison with manual pulling in or by means of motorcar.

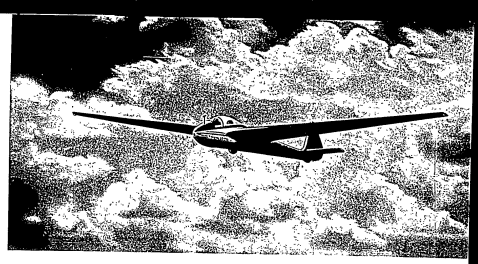
The pulling in of the launch-winch rope from a distance of 1000 meters by means of the pulling-in-winch "RYŚ" does not exceed 60 seconds. At the well organized glider launching disposing of no more than one set of "ŻUBR" and "RYŚ" winches one launch can be performed every 2—3 minutes.

The pulling-in-winch "RYŚ" is provided with one cylinder, two stroke, air cooled petrol engine of "S—62" type with magneto ignition. The pulling-in rope drum with claw clutch and drop type brake is acting in the same way as that of the "ŻUBR 3" winch. The towing rope reeling device and safety scissors are located on the drum. The folding type saddle for the operator is provided in front of the control board. The housing, made of metal sheets and wire netting, serves for covering the pulling-in-winch mechanism.

SPECIFICATION

Type: RYŚ
Engine power at 3000 r.p.m. 9,8 m.p.s (7,89 h.p.)
Cylinder capacity 343 ccm. (21 cu. in.)
Overall dimensions
Length (undercarriage excluded) 1840 mm. (6,05 ft.)
Width 1000 mm. (3,28 ft.)
Height 2900 mm. (2,95 ft.)
Weight 240 kg. (530,8 lbs.)
Pulling strength 100 kg. (110 lbs.)

Jaskółka

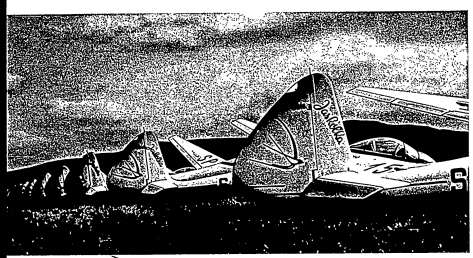


HIGH PERFORMANCE SINGLE-SEAT GLIDER

The following world records have been established on the "Jaskółka" glider:

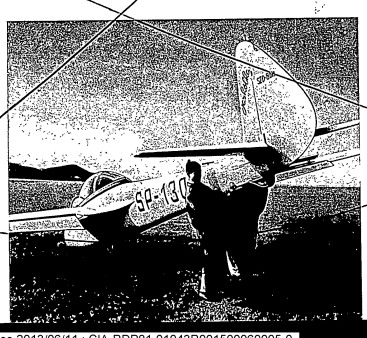
Men: speed over 100 km. (62,1 miles) triangular circuit 94,716 km/h. (58,82 m.p.h.) speed over 200 km. (124,2 miles) triangular circuit 67,304 km/h. (41,82 m.p.h.)

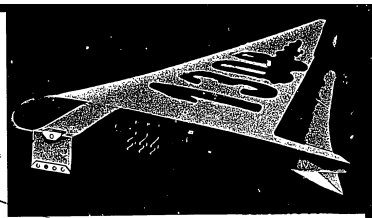
Women: speed over 100 km. (62,1 miles) triangular circuit 78,564 km/h. (48,83 m.p.h.) goal and return flight on distance 328,25 km. (203,81 miles)



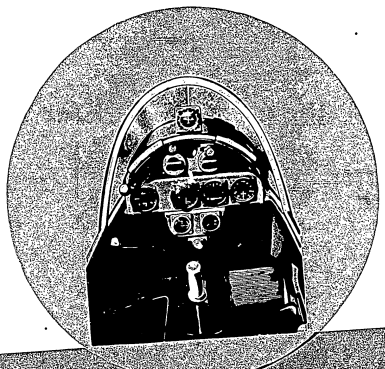
"JASKÓŁKA" is a modern high performance glider designed for high performance and record flights. Further it can be used for training flights both for thermal soaring and flights in clouds without visability. The construction of this glider meets all demands of modern aviation owing to the aerodynamic design as well as to its excellent piloting facilities.
The additional advantage of the "JASKÓŁKA" glider consists of the automatic coupling devices for the control system which allow for keeping it in small hangars ensuring its very rapid and easy preparation for flight (within 3—10 minutes).
"JASKÓŁKA" is outfitted with a complete electric equipment including lights and lightning protector.

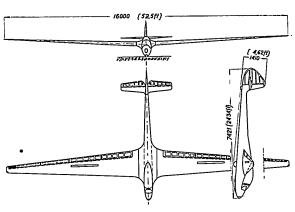
This glider can be equipped on request with oxygen apparatus and total energy variometer
The standard equipment of instrument panel consists of airspeed indicator, variometer, altimeter, compass, and electric turn and slip indicator with cross level
Moreover, the plane is equipped with a set of tools and covers for canopy protection





"JASKÓŁKA" is a cantilever mid-body mounted wing glider of wooden construction. The monospar wings are covered with plywood. The ailerons are in two parts, of split type, differentiated and aerodynamically compensated. The Fowler flaps may be set in three positions for 0°, 12°, and 25°.
The diving brakes are of scissor type.
The fuselage of oval cross-section is entirely covered with plywood, it has in its front portion the pilot's cockpit with plexiglass canopy.
A single-wheel undercarriage is provided, half-retracted in the fuselage.
The wheel is provided with a mechanical brake, synchronized with the air brakes.
Further, the fuselage is provided with a short front skid, front and bottom tow-hooks for aero-tow or winch-launching, front and rear tow-hooks for launching by means of rubber rope when in slopes.





SPECIFICATION:

Total max. weight in flight — 340 kg (749, 20 lbs.)
Weight of pilot (equipment included) — 90 kg (217,98 lbs.)
Wing loading — 35 kg./m². — (5,12 lbs./sq. ft.)
Best gliding ratio (at 80 km/h) (49,7 m.p.h.) — 1:26,4
Min. sinking speed (at 66 km/h) (42,3 m.p.h.) — 0,76 m/sec.
(240 in./sec.) (2,49 ft./sec.)
Max. permissible airspeeds:
Max. speed at winch-start — 110 km./h. (68,3 m.p.h.)
Max. speed at aero-tow (2 x 5,5 = 11) — 160 km/h (99,36 m.p.h.)
Max. diving speed — 250 km/h (155,25 m.p.h.)
Max. speed with extended flaps 120 km/h (74,58 m.p.h.)
Flight in clouds 240 km/h (149,04 m.p.h.)
Max. permissible stresses: factor m=5,3 n=2,65
Breaking load factor m=10 n=5,29

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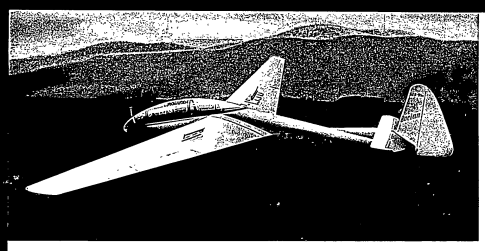


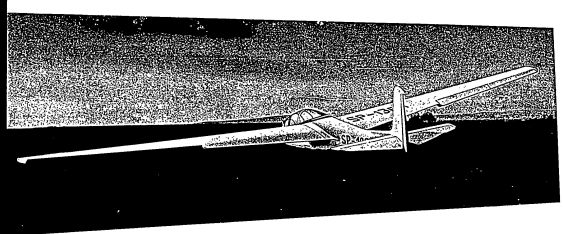
Rocian

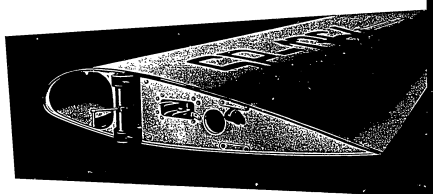
HIGH-PERFORMANCE TWO SEATER

holder of following world records

Men: speed over 200 km. (122,4 miles) triangular circuit 66,048 km /h (41,02 m p h.)
speed over 300 km (186,3 miles) triangular circuit 50,336 km /h. (31,25 m.p h)

Women: speed over 200 km (122,4 miles) triangular circuit 50,341 km /h. (31,3 m.p.h.)



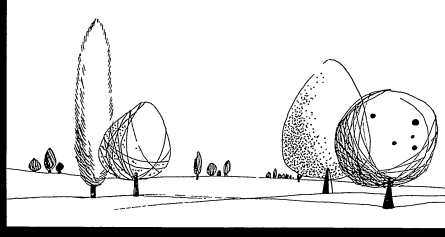


"BOCIAN" — an excellent modern high-performance glider highly appreciated for its aerodynamic characteristics, spacious comfortable cockpit and many advantages of easy service when on the ground.

"BOCIAN" is particularly recommended for a rapid initial training of pilots for engine driven aircrafts. The essential features of "BOCIAN" are perfect visibility from both cabins, placed almost entirely in front of the wing, the perfect manoeuvrability, easy effortless control handling and piloting.

A great advantage of "BOCIAN" (alike "Jaskółka") is an automatic command coupling, which minimizes the time of assembling of the glider and next, the electric equipment including lighting installation and lightning protector

This glider is provided with an instrument panel equipepd in airspeed indicator, altimeter, two variometers, compass and an electric turn and slip indicator with a cross level; covers for canopy protection and a set of tools.



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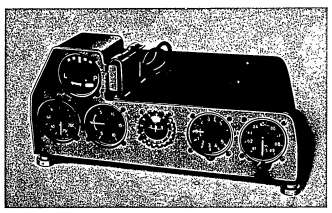


"BOCIAN" is a cantilever mid-body mounted wing glider, two-seater of wooden construction. Its fuselage contains a comfortable cockpit with two seats in tandem. The rear seat is located in the centre of gravity enabling thus one pilot flights without ballast weights.

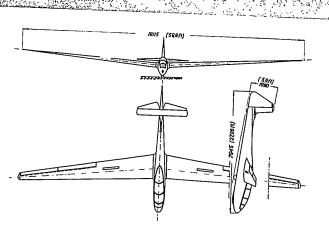
The wing in two parts of singlespar type has a stiff ply-covered torsion-box. The wing has a forward sweep. The ailerons in two parts, differentially operated and aerodynamically compensated have a separate control handling for each part. Air brakes are of scissor type, and have an automatic blocking of control command when retracted.

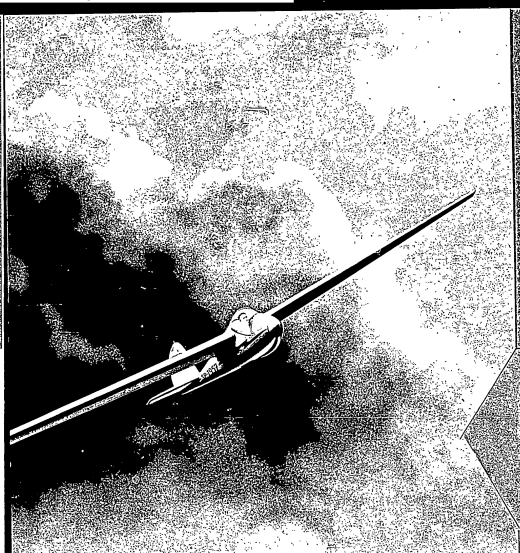
The fuselage of oval cross section is entirely covered with plywood. The cockpit has a plexiglass canopy.

The landing wheel and a short front skid are under the fuselage. The wheel is provided with a mechanical brake synchronised with the air brakes. The grips designed for glider carrying off are located before the tail unit. They facilitate the transport of the sailplane when on the ground.

SPECIFICATION:
Total max. weight in flight 500 kg. (1102,5 lbs.)
Weight of crew (equipment included) 170 kg. (375 lbs.)
Wing loading 25 kg./m² (5,12 lbs./sq. ft.)
Max. gliding ratio (at 80 km./h.) 26
Min. sinking speed (at 71 km./h.) 0,83 m./sec. (2,69 ft./sec.)

MAX. PERMISSIBLE SPEEDS:
Max. speed at winch-start 115 km./h. (71,41 m.p.h.)
Max. speed at aero-tow 140 km./h. (86,94 m.p.h.)
Max. diving speed 200 km./h. (122,4 m.p.h.)
Max. speed with extended air brakes 180 km./h. (110,15 m.p.h.)
Flight in clouds 130 km./h. (80,73 m.p.h.)
Stalling speed 53 km./h. (32,29 m.p.h.)
Max. permissible stressing factor in = +6,3
Breaking load factor n = +10,5 = 5,25



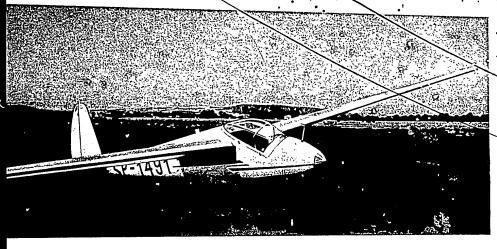


Mucha 100

THE SINGLE—SEAT TRAINER FOR PERFORMANCE GLIDER

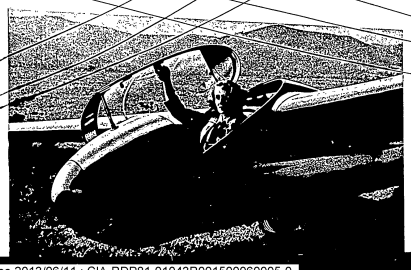
The single seat trainer and performance glider "MUCHA 100" is an improved version of the "MUCHA" glider, holder of following Polish records:

Men: open flight distance — 616 km. (382,92 miles)
Women: fixed goal flight 320 km. (198,72 miles)
gain of altitude 6350 m. (20.933 ft.)
absolute altitude 6390 m. (20.965 ft.)

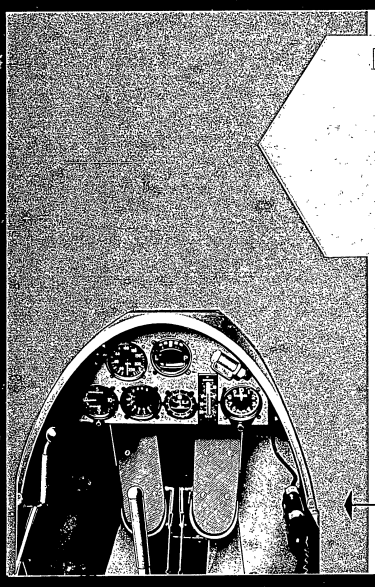


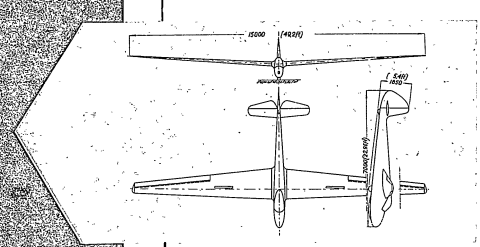
"MUCHA 100" an unexpensive glider is perfectly suited for thermal and slope-soaring, as for flights in clouds.
Good aerodynamic features, simple handling, perfect finishing and comfort are the characteristics of th n.achine
Owing to its up-to-date construction the "MUCHA 100" glider meets all modern requirements It is to be added, that neither tools nor additional elements are necessary for assembling and dismantling the "MUCHA 100"

The instrument panel is fitted with airspeed indicator, altimeter, variometer, electric turn and slip indicator with cross level, longitudinal clinometer and compass.
Further this glider is outfitted with electric installation, lightning protector as well as with covers for canopy and Venturi tube protection On request this glider can be equipped with oxygen breathing apparatus



"MUCHA 100" glider is a single-seater with cantilever wings, entirely built of wood. The monospar wing with oblique auxiliary spar has a ply-covered leading edge stiff agains: torsion (torsion box) The undivided ailerons differentially operated are aerodynamically compensated and mass-balanced
Air brakes are of scissor type
Longitudinal oval cross section fuselage is entirely plywood-covered. The cockpit with the streamlined plexiglass canopy is outfitted with a comfortable seat, with safety-belts and tarpaulin covered back-rest, which declivity can be regulated on the ground. This glider is outfitted with front and bottom tow-hooks as well as with a starting hook for the launching by means of rubber rope
The transport wheel and short front and rear skids are located under the fuselage The skids are shock-absorbed by means of rubber pads The skids facilitate the take-off and ensure a smooth landing A folded grip located before the tail unit is provided for carrying the tail when manoeuvring on the ground





SPECIFICATION:

Total max. weight in flight 290 kg. (638 lbs.)
Weight of pilot (equipment included) 105 kg. (231 lbs.)
Wing loading 17,3 kg./m² (3,53 lbs /sq. ft.)
Max. gliding ratio (at 70 km./h.) (43,5 m.p.h.) — 24
Minimum sinking speed (at 60 km./h.) (37,3 m.p.h.) 0,77 m./sec. (2,53 ft./sec.)
Max. permissible speeds:
Max. speed at winch start 94 km./h. (58,4 m.p.h.)
Max. speed at aero-tow 130 km./h. (80,7 m.p.h.)
Max. diving speed 220 km./h. (136 m.p.h.)
Diving with extended air brakes 200 km./h. (124,2 m.p.h.)
Stalling speed 50 km./h. (31 m.p.h.)
Max. permissible stressing factor: n = +6; −3
Breaking load factor n = +10,5; −5,25

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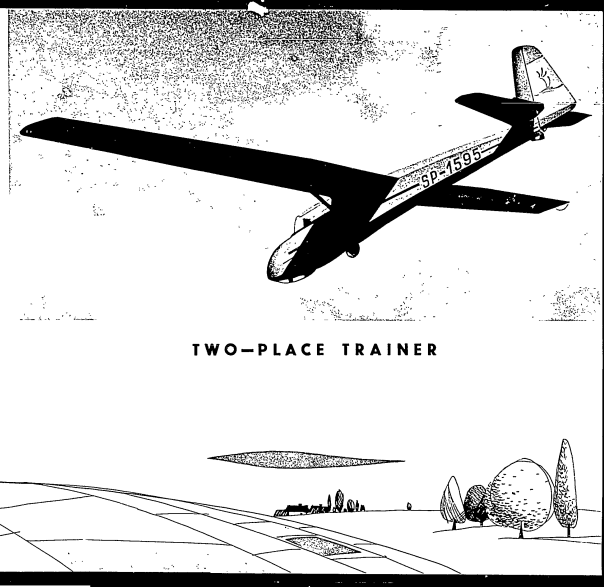
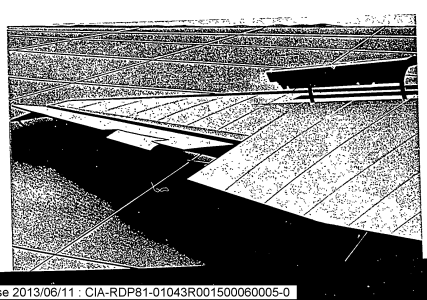
Zapla



TWO—PLACE TRAINER

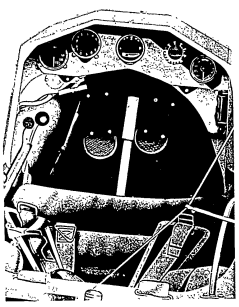
Two-place trainer, designed both for primary training, dual control flying instruction and first solo flights as well as for acrobatics learning.
The glider distinguishes itself by a security of flight, easy control handling, long life, and insensability against various flight irregularities. Good shock-absorbing properties of its landing wheel allow for a hard beginner-landing.
The spacious cockpit ensures full comfort for the crew during the flight. Also the instructors task lasting often many hours is much easier. The aerodynamic features and rigidity of "CZAPLA" enable the flight in clouds.

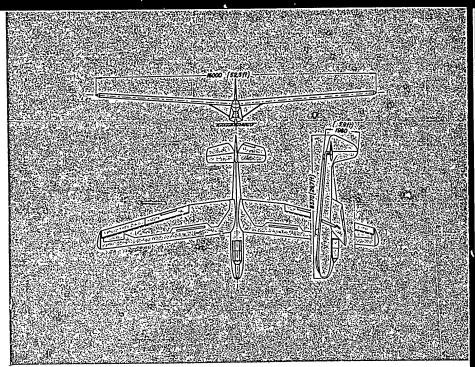
The standard equipment consists of
— instrument panel with airspeed indicator, electric turn and slip indicator with cross level, compass, variometer and mechanical tow release indicator.
— set of tools for assembling and dismantling of the glider.
— covers for canopy and Venturi tube protection.

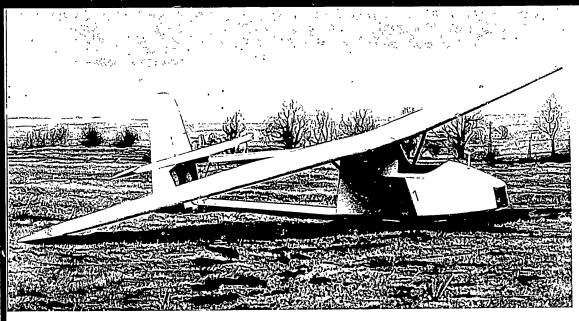


"CZAPLA" is a strut braced high wing glider built of wood. The wings are of monospar construction. The strut braced wings (metal struts have a streamline shaped section) are outfitted with air brakes of scissor type. The differentiated ailerons of split type are aerodynamically compensated and outfitted with trim tabs. The fuselage of hexagonal cross section is covered entirely by plywood. The crew cockpit with a plexiglass canopy is located in front part of the wing. The metal plate door is located on the left hand board.
A single landing wheel suspended on two telescopic shock-absorbers is fitted under the fuselage before the centre of gravity.
The landing wheel has a brake synchronised with the air brakes. The fuselage is outlined with a short front skid shock-absorbed by means of rubber discs.
Tail skid is shock-absorbed with rubber pad.

Czapla







Salamandra

SINGLE — SEAT TRAINER

SPECIFICATION:

Total max. weight in flight 440 kg. (968 lbs.)
Weight of crew (equipment included) 160 kg. (353 lbs.)
Wing loading (crew: two pilots, each weighting 70 kg. (154 lbs.) 17,5 kg /m² (3,50 lbs./sq. ft.)
Best gliding angle (at 64 km./h.) (39,8 m.p.h.) — 17,1
Min. sinking speed (at 52 km./h.) (32,3 m.p.h.) 0,96 m./sec. (3,15 ft./sec.)

Max. permissible speeds.
Max. speed at winch start 100 km /h. (62,1 m.p.h.)
Max. speed at aero-tow 110 km./h. (68,3 m.p.h.)
Max. diving speed with air brakes extended or retracted 160 km./h. (99,4 m.p.h.)
Stalling speed 40 km./h. (24,8 m.p.h.)
Max. permissible stressing factor n = +4,5, —2,25
Breaking load factor n = +7,9, —3,9

Single seat trainer" **SALAMANDRA 53**" characterized by an easy control handling is suitable for pilots trained on school-gliders, prior to pass on the training gliders of higher cathegory. Its relatively high aerodynamic performance enables the thermal and slope soaring and even the performance flights.

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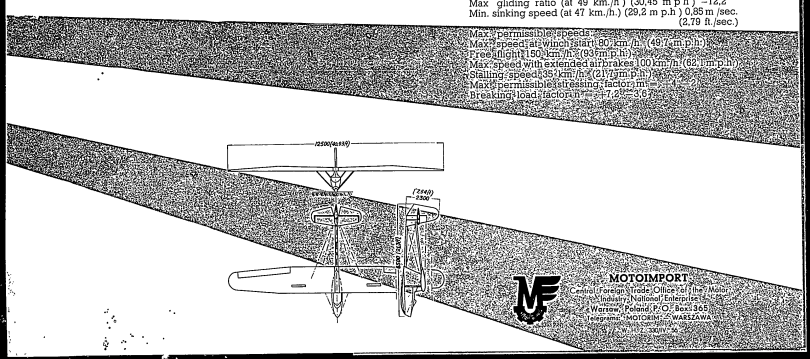
"SALAMANDRA" is a strut braced high wing glider with framed body, made out entirely of wood.
The monospar wing in two parts rear auxiliary spar has differentially operated ailerons and air brakes.
The framed body has in its rear-portion the crossed pianowires.
The cockpit, open type with a small windshield is situated in the front portion of the fuselage.
The wooden landing skid, shock-absorbed with two tyres is situated under the cockpit. The instrument panel is fitted in three basic flight instruments:
airspeed indicator, variometer and altimeter. The knob of the front releaser is located close by the instrument panel.

SPECIFICATION:

Total max. weight in flight 225 kg (495 lbs.)
Weight of pilot (equipment included) 85 kg. (187 lbs.)
Wing loading 13,30 kg /m². (2,73 lbs /sq. ft.)
Max gliding ratio (at 49 km./h.) (30,45 m p.h.) –12,2
Min. sinking speed (at 47 km./h.) (29,2 m p.h.) 0,85 m /sec. (2,79 ft./sec.)

Max. permissible speeds:
Max. speed at winch start 80 km./h. (49,7 m.p.h.)
Free flight 180 km./h. (93 m.p.h.) steady flight
Max. speed with extended airbrakes 100 km./h. (62,1 m.p.h.)
Stalling speed 35 km./h. (21,7 m.p.h.)
Max. permissible stressing factor n=
Breaking load factor n=



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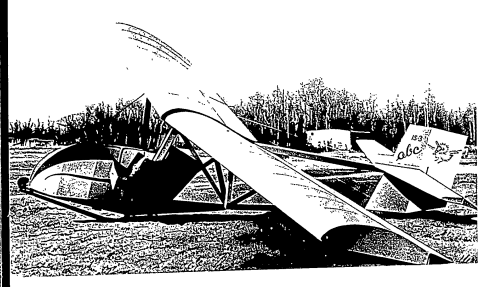


SINGLE – SEAT PRIMARY TRAINING GLIDER

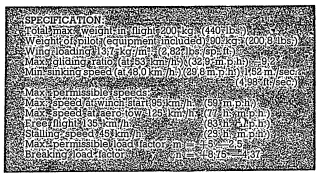
"A.B.C." – A.g. – designed for primary training – it suits perfectly for training on the flat country – at winch launching, and in mountainous country – at launching by means of rubber rope.

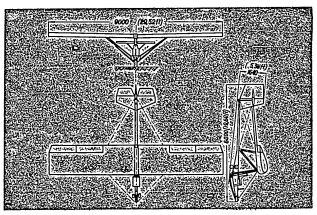
"A B C — A" is a strut braced high-wing glider of wooden construction with framed body made rigid by means of pianowires. It has a divided two-spar wing The ailerons are not differentially operated. The body frame built of box-section longerons has in its front portion a main longeron on which the pilot's seat is located.

The wooden landing skid shock-absorbed by means of a friction spring shock-absorber is located under the main longeron. A folding wheel is situated behind the skid. It facilitates the glider's transport when on the ground. The pilot's seat can be hooded with an open cockpit. Owing to this, pilot may be acquainted with flight sensation on cabin-gliders The cockpit belonging to a special equipment of a glider may be added to the outfit on request

SPECIFICATION

Span	15 m (49.2 ft)
Length	6.6 m (21.7 ft)
Height	1.5 m (4.9 ft)
Wing area	13.5 m² (145.3 sq ft)
Aspect ratio	16.7
Airfoil	Göttingen 549
Max. weight in flight	300 kg (440 lbs)
Weight of pilot (equipment included)	100 kg (220.6 lbs)
Wing loading	9.3 kg/m² (2.827 lbs/sq ft)
Max. gliding ratio (at 53 km/h)	(32.9 m.p.h.) 1:24
Min. sinking speed (at 90 km/h)	(28.6 m.p.h.) 1.66 m/sec (4.98 ft/sec)
Max. permissible speed	250 km/h (155 m.p.h.)
Max. speed during winch start	95 km/h (59 m.p.h.)
Max. speed during aero-tow	120 km/h (77.5 m.p.h.)
Free flight	35 km/h (63 m.p.h.)
Stalling speed	45 km/h (28 m.p.h.)
Max. permissible deceleration	5 g
Breaking load factor	8.75 — 9.37





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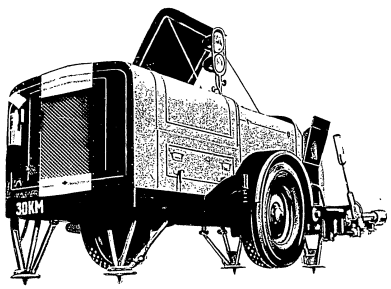
THE WINCH "ŻUBR 3"



The winch **"ŻUBR 3"** is an auxiliary machine for launching of both one- or two-seat gliders. Depending on both the length of the towing rope untwisted for launching and on atmospheric conditions this winch raises the glider to 300 meters (984 ft) when pulling by the front-hook and ca. 500 meters (1640 ft.) when pulling by the bottom tow-hook.
The winch **"ŻUBR 3"** works very efficiently together with the pulling-in-winch **"RYŚ"**.

The winch **"ŻUBR 3"** distinguishes itself by reliable operation, simple and easy service, low maintenance cost, possibility of rapid preparation for operation and folding up all mechanisms as soon as operation is finished. It is particularly advantageous at frequent changes of wind direction, what results in repeated shifting from one working place to another.

The winch **"ŻUBR 3"** is mounted on steel framing located on a bi-wheeled undercarriage provided with an independent suspension and shock-absorption by means of spiral springs.
The winch when working is put four fixed legs by means of a special jack.
The winch **"ŻUBR 3"** is provided with a 6-cylinder, four stroke, top valve, water cooled petrol engine of "S—42" type, **arranged a unit** with clutch and gearbox. The winch-launch set consists of a cable drum with drop type brake, rope reeling device on the drum and security scissors.

The winch **"ŻUBR"** is provided with signalling lights for the launching. A speedometer, indicating the speed of the drum reeling the towing cable as well as the instruments controlling the engine's work i.e. oil pressure gauge, cooling water thermometer and an amperometer are located on the instrument panel in the cabin.

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SPECIFICATION:

Engine power (at 2.800 r.p.m.) 85 h p. (83,8 b.h.p.)
Cylinder capacity 4188 ccm. (255 cu. in.)
Length of the towing rope on the drum 1200 m. (3940 ft.)
Overall dimensions:
Length (shaft excluded) 2760 mm. (9,05 ft)
Width 1810 mm. (5,94 ft.)
Height 1280 mm. (4,18 ft.)
Weight 1440 kg. (3168 lbs.)